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VETERINARY MEDICINE

NOVEMBER 1942

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No. 11

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At Johns Hopkins Hospital experimental findings in laboratory animals show that callus formation in cases with delayed union fractures is increased following treatment with estrogenic hormone.

The Medical School of Harvard University has been experimenting for 18 months with the use of bovine blood plasma for human transfusion. Results of its use on 2,714 inmates of Massachusetts penal institutions have been promising.

The Arabian Club of America has donated 12 purebred horses to the U. S. Army, and they have been placed in the remount depot at Ft. Robinson, Nebr. The Arabian is a good saddle horse, high spirited, courageous, easy to train and usually unafraid of noises or other animals.

It is said that William the Conqueror introduced into England the custom of shoeing horses, and the importance he attached to the practice is shown in a story to the effect that he gave the town of Northampton to the inspector of the farriers, and bestowed upon that gentleman the name Ferrers. The coat of arms of the Earl of Ferrers is still adorned with a horseshoe. Northampton is famous today for the manufacture of boots and shoes.—

Horned and hoofed mammals—game animals from all parts of the world—are exhibited in the Field Museum of Natural History, Chicago.

Among the 14 kinds of ticks collected in Iowa were several species not previously reported there. *Amblyomma ovale,* found on a dog, is native to South America and has not been reported previously in this country.—*S. N. L.*

The military correspondent of *The Star,* England, writes: "The Home Guard are turning more and more to horses and away from motors for patrol work, because of their silence and their mobility in lonely, rough country. Hundreds of horses are ridden in cavalry formation by the Home Guard nearly every night."

A millimeter is approximately one-twenty-fifth of an inch. A micron is one-thousandth of a millimeter. A millimicron is one one-thousandth of a micron, one millionth of a millimeter, one twenty-five-millionth of an inch. The virus of foot and mouth disease (the smallest known virus) is only ten millimicrons in diameter. Psittacosis virus, the largest known virus, is but 275 millimicrons in diameter.

C. M. Haring, professor of veterinary science in the University of California College of Agriculture, has been appointed consultant to the War Manpower Commission of which the Honorable Paul V. McNutt is the head.

* * * *

The wild cottontail rabbit is the most important host and transmitter of tularemia east of the Mississippi River. In the western states the jack rabbit, cottontail and snowshoe rabbits are the principal hosts. There are no authenticated records of tularemia acquired from contact with domesticated rabbits. Rabbits raised under domestic conditions, although highly susceptible, have not been found naturally infected, probably owing to their freedom from the ticks which commonly infest wild rabbits.

* * * *

A.M.A. Cancels 1943 Meeting

The American Medical Association will not hold its 94th annual session, scheduled to meet in San Francisco in 1943. This is the third time that the annual meeting has been canceled; the first and second cancellations were made during the Civil War. Th Board of Trustees voted that the meeting be not held because of "the tremendous demands on the medical profession of the United States in association with the war, including the provision of physicians for the armed forces, for the care of veterans, for industry and for the care of the civilian population." And further because "the annual session of the Association with the attendance usually assembled on such occasions would take away from medical practice at the time from six to ten thousand doctors, together with many persons in associated professions concerned with the Scientific Exhibit, the Technical Exhibit and other features. The demands on the time of physicians are already innumerable. Moreover, the holding of the session in San Francisco would involve transportation in large part from other sections of the country, calling particularly on the railroads and also on all other means of transportation."

Karl F. Meyer, director of Hooper Foundation of the University of California has been chosen president-elect of the Western Branch of the American Public Health Association.

* * * *

The Council for Scientific and Industrial Research reports that opium poppies can be grown in Australia. This is of interest, since imports of opium which is a source of important medicinals, have been cut off from the Far East by the war.

* * * *

Lieut. Col. Sam F. Seeley has been detached, by order of the War Department, from the position as executive officer of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians, and ordered to active duty with the Army Medical Department.

* * * *

Large meat packers, which slaughtered more than 100,000 sheep during the year prior to September 8, have been instructed by WPB to make no more deliveries of sheep intestines until all purchase orders for the purpose of manufacturing surgical sutures are filled. Heretofore only the first nine yards of the intestine were used for these sutures, however the new order (M-220) makes available the entire intestine for this purpose.

On account of transportation packers west of the Rocky Mountains were not included in the order.

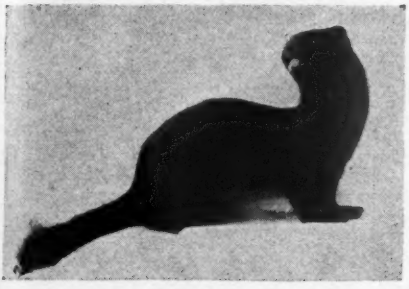
* * * *

Allen and associates at the University of Chicago Medical School report better results, than from any other treatment for burns, from an ointment-base composed of petroleum 95% and oxycholesterol to which is added 20% of sulfathiazole. After cleaning with sterile gauze the ointment is applied over the whole area injured. The pain is relieved promptly, healing occurs rapidly and scarring is minimal. In severe burns the local treatment must be supplemented with intravenous injections of blood plasma. The ointment gave equally gratifying results in the treatment of more than 150 superficial wounds of all types.

A. I. Coombes, University of Wisconsin fur animal nutritionist, has suggested the following as a good fox ration:

	%
Horse (or other) meat with bone	35
Liver	5
Cooked fish	10
Viscera	10
Cereal mixture	33.5
Vegetables (carrots, tomatoes, etc.)	5
Dried brewer's yeast	1
Cod-liver oil	0.5

The whole is made up to the proper volume and consistency with water or liquid skim milk if desired.



Fish, fresh or canned, is fed to both foxes and minks

Canned Fish for Summer Mink Ration

The inclusion of fish in mink rations is becoming quite prevalent. Ranchers who cannot easily obtain fresh fish or trimmings are dependent upon the canned product.

Four experiments, three with weaned kits and one with adult minks, were conducted to determine the advisability of using canned ocean whiting as a partial substitute for raw meat in the summer mink ration.

Regardless of whether the canned fish replaced one-third or one-half of the meat, equally satisfactory results were obtained with both kits and adults.

The cost of the canned fish will necessarily determine the amount which will be used. As an emergency substitute for dwindling meat stocks it is commendable, particularly since it can always be kept on hand ready for instant use, without danger of spoiling and without the need for refrigeration.—*Director, U. S. Fur Animal Expt. Sta.*

Spotted Fever Spreading

Just about one-fifth of the present reported cases of Rocky Mountain spotted fever occur in the Rocky Mountain States. Formerly the disease was almost entirely indigenous to that section.

A vaccine for prevention of Rocky Mountain spotted fever was developed by the U. S. Public Health Service—but a promising serum for treatment of the disease has been but recently available.

Sulfa Drugs Cause Mental Confusion

Since the use of the sulfa drugs causes mental confusion a responsible military official or civilian executive should not be called upon to make a vital decision for several days after being given one of the drugs.

Medical authorities of the Association of American Railroads have recommended that the engine and train crew members be relieved of duty for seven to 14 days after being treated with a sulfonamide.

Dangers in Use of Sulfathiazole

Warning against the use of sulfathiazole in wounds of or operations on the brain is given by doctors of Vanderbilt University, who state that convulsions and even death may result from contact of this drug with brain tissue. Sulfanilamide and sulfadiazine apparently are less irritating to brain tissue but the authors advise caution in their use in brain surgery until more is known concerning their action.

Watt and Alexander in Lancet[1] report several cases where sulfathiazole was used close to the brain. Many cases, more particularly those in which the sulfathiazole was used in the frontal region, developed intermittent epileptic seizures. This epileptogenic property of sulfathiazole has been confirmed experimentally with cats. Apparently, other sulfonamides do not have this property.

[1] Watt, A. C. and G. L. Alexander, 1942. Epilepsy following application of sulfathiazole near brain. *Lancet*, London. 1, p. 493.

Pack Artillery in Panama*

Pack artillery must necessarily play an important part in many operations connected with hemisphere defense. Much of the terrain in the vicinity of the Panama Canal can only be traversed by artillery.

Photo *U. S. Signal Corps*

MACHINE GUN UNIT SOMEWHERE IN LOU ISIANA DURING THIRD ARMY MANEUVERS

Machines must be used wherever possible in order to save manpower. But first of all, the proper technical team to achieve tactical success must be used. Man hasn't made the machine yet that will replace the foot or mounted soldier or their ally, the pack mule. Nature has conspired to render difficult the development of extensive road nets through the jungles of Panama. Pack soldiers are a specially chosen lot because the work is hard, the marches long and fast. They must be at least 5 feet 10 inches in height and be able to march between 3.5 and 4 miles in 50 minutes of every marching hour. Minimum weight for these soldiers at enlistment is 150 pounds with a view to building up to condition weight with arduous work and the Army ration. Efficiency of this program is exemplified by the execution of the 2nd Field Artillery Battalion's 26 mile march into Fort Clayton in 7 hours in Panama Mobile Force maneuvers. Our 75-mm howitzer is strictly an American product. It will stop a tank dead in its tracks. The gun breaks-down into six loads for pack transportation or in other words, six mules carry one howitzer. It is a quick-firing piece with a curved fire range of five miles. All ammunition and supplies are carried on pack mules. Each battery has its own maintenance section and thus equipped, is the most independent of all arms.

The gun is invincible, the mule invulnerable, the packers, drivers and gunners a hardy race of toughened straight shooting, hard walking artillerymen whose equals are not to be found in any Army.

* *Army and Navy Register*, April 26, 1941.

Ether Used 100 Years

The year 1942, marks the 100th anniversary of the discovery of the anesthetic properties of ether. A country practitioner, Crawford Williamson Long, M.D., Jefferson, Georgia, first used ether as an anesthetic in a surgical operation in March, 1842. Doctor Long, while a Medical student at the University of Pennsylvania, had promoted a number of parties called "ether frolics," where the young people inhaled ether for its contribution to hilarity. Some of the students were accidentally injured by falling while under its influence and Long observed they suffered no pain. Later, when a patient, James Venable, required the removal of a tumor from his neck and complained of the pain, Doctor Long gave him ether and removed the tumor painlessly. Long did not make his discovery known and four years later a Boston Dentist, Morton, demonstrated the use of ether as an anesthetic at a clinic at the Massachusetts General Hospital. Because Long did not publish his discovery and Morton did, the latter received credit for the discovery.

Mild Tincture of Iodine for Wounds

With the widespread interest in first aid instruction and the distribution of millions of first aid manuals throughout the country, the druggists have been swamped with calls for "Mild Tincture of Iodine, U. S. P.," which has been adopted for first aid treatment by the Army, the Navy and the American Red Cross. Since reports indicate that some druggists express ignorance of the existence of such a product, the formula for Mild Tincture of Iodine, U. S. P. follows:

	Metric Formula	Alternative Formula
Iodine	20 Gm.	146 grains
Sodium iodide	24 Gm.	175 grains
Diluted alcohol	to make 1,000 cc.	1 pint

Dissolve the iodine and the sodium iodide in sufficient diluted alcohol (equal parts of alcohol and water) to make 1,000 cc.

According to E. Fullerton Cook, chairman of the Committee of Revision of the Pharmacopeia of the United States of America, pharmacists should always sell the U. S. P. Mild Tincture of Iodine for first aid, not the strong (7%) tincture of iodine; neither should they prepare the mild tincture by diluting the strong tincture, for then it will contain potassium iodide instead of sodium iodide, and the alcohol percentage will not be correct. Sodium salts are much better for application to a wound than are potassium salts. Dr. Cook's announcement says that the strong (7%) tincture of iodine should never be applied to a wound, as it evaporates quickly, leaving crystals of free iodine in the wound, which injure the tissues and prevent healing.—*Jnl. A.M.A.*, 119:12, p. 954.

Extension of Red Cross Blood Procurement Project Requested

The Surgeons General of the Army and the Navy have requested a tremendous expansion of the Red Cross blood procurement project. This will mean an increase from the 900,000 donors at present to 2,500,000—almost tripling the number over that of the current fiscal year and will require 50,000 donors per week.

At present there are 18 blood donor centers operated by Red Cross chapters in the more populous areas. Since the blood must reach the processing laboratory within 24 hours after being drawn, it is not feasible, because at present there are not many processing laboratories, to establish donor centers in small communities, however, several additional laboratories are expected to be participating shortly and the capacity of those already processing blood is being expanded.

The blood secured at these centers is processed at the laboratories into plasma, dried plasma, and of recent development, serum albumin. In most instances, where transfusion is required, plasma or dried plasma may be used as a substitute for whole blood, however the serum albumin will be used mainly as a supplement to dried blood plasma.

The average healthy person can safely donate blood every three months—or at a time when the blood has regenerated to normal hemoglobin content which may be facilitated by the use of iron therapy.* It is advantageous also that the diet of regular donors be supplemented with iron.

* *Vet. Med.*, May, 1942, p. 192.

Efficacy of Rabies Vaccine Tested

Johnson and Leach of the Rockefeller Foundation reported, at the 70th annual meeting of the American Public Health Association, a fourth experiment designed to determine the value of anti-rabies vaccine. In this experiment 126 dogs were divided into four approximately equal groups. Group I was given 5cc of chloroform inactivated vaccine containing 33⅓% brain tissue. Group II was given an equivalent dose of the same vaccine frozen and dried in vacuum. Group III was given 5cc of phenol inactivated vaccine containing 33⅓% of brain tissue. Group IV were used as controls. All were inoculated after 31 days with street virus. In group I, 6% died of rabies; in group II, 26%; in group III, 10%, and in group IV, 56% died of the disease.

The results in this experiment were practically identical to these reported for chloroform inactivated vaccine in earlier experiments.

Courtesy Jen Sal Lab.

Rabbits are often used to test rabies vaccine

* * * *

Alkali deficit resulting from alkali loss follows administration of sulfanilamide to dogs. This can be remedied by giving alkalis in adequate amounts along with sulfanilamide.—*Jnl. Lab. & Clin. Med.*

* * * *

Blood Transfusion

Any dog may be used as a donor for any other dog; typing is unnecessary except perhaps in the transfer of blood from a purebred to a purebred. If a dog is subjected to repeated transfusions from the same donor, however, a sensitization may develop; it is therefore advisable to use a different donor each time.—*Harry J. Robertson.*

Experimental peptic ulcer produced by the Mann-Williamson technic in dogs resulted in death after an average of 53 days. When dogs with similar ulcers were given daily injections of 1cc Antuitrin-S, average survival time was 97 days.—*Am. Jnl. Digest. Dis.*

Single Daily Doses of Vaccine

Experimenting with the effect of frequency of dosage of rabies vaccine upon immunity, Moss found that the administration of multiple daily doses seemed to retard immune response. An earlier response with a longer duration of immunity was obtained by single daily doses.—*Jnl. of Lab. and Clin. Med.*

* * * *

Rabies Prevalence

According to reports received by the U. S. Bureau of Animal Industry for the calendar year 1940 there were in Continental United States 7,238 cases of rabies: including 6,194 cases in dogs, 326 in cattle, 260 in cats, 170 in foxes, 71 in swine, 53 in sheep, 25 in horses, nine in skunks, five in mules, four in goats, three in coyotes, three in squirrels, one in a rabbit, one in a rat, 85 cases in which the animal affected was not stated and 28 cases in man.

In some states the reports seem fairly complete, in others it is a fair assumption that but a minor fraction of the cases actually occurring (except in man) came to the attention of the livestock sanitary authorities. In reported cases Michigan led with 715; Georgia was second with 601 cases; Ohio third with 592 cases; Tennessee fourth with 486 cases and New Jersey fifth with 420 cases.

Blood Serum and Plasma Transfusions*

Serum and plasma are intrinsically the same, but certain practical differences make serum preferable to plasma. Serum is the liquid portion obtained from blood which has been permitted to clot spontaneously; plasma is the liquid portion obtained from blood which has been prevented from coagulating by the addition of an anti-coagulant—usually sodium citrate.

Four differences are noticeable:

1. *Ease of preparation.*—Plasma is more easily prepared than serum. Because there is a greater margin of safety, much less care is necessary in processing plasma—serum must be prepared by specially trained workers.

2. *Efficiency of the product.*—Since serum contains no diluent, it is, cc for cc, more efficient than plasma that has been diluted with an anti-coagulent.

3. *Fibrinogen content.*—Serum is free of fibrinogen which is converted into fibrin in the spontaneous coagulation of the whole blood. This blood protein is present only in small amounts. Plasma contains all the fibrinogen of the blood from which it is produced. This fibrinogen is a liability as described in 4.

4. *Stability.*—Serum may be kept clear and usable indefinitely. Plasma, upon standing, may become unfit for intravenous administration; as the fibrinogen is converted into fibrin precipitates such as fibrin veils and granular debris. These changes make it advisable to use plasma only when fresh, or if this granular deposition occurs it should be filtered before it is used. Serum, on the other hand, is free from this objectionable feature.

In man the typing and compatibility tests necessary for whole blood transfusions are unnecessary when serum or plasma is substituted. In some cases of shock from causes other than hemorrhage, serum or plasma can be given before satisfactory arrangement could be made to give blood. In cases of shock due to hemorrhage, the shock can be counteracted in the interval before whole blood transfusion can be started.

Plasma is made from blood of "healthy, fasting, afebrile donors" who are free from infections or contagious diseases. The blood is refrigerated within one hour after it is drawn and centrifuged within 24 hours at 1500 R.P.M. The supernatant plasma is drawn into a sterile container, through a closed system, and stored at 2 to 4° C.

Heating the plasma or serum or the tubing through which it is flowing causes a partial coagulation or denaturation of the serum proteins which bring on severe reactions. [The senior author, Dr. Sidney O. Levinson, is chairman of the Division of Blood Transfusion and Blood Banks of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians for National Defense.]

*Excerpts from an article by Sidney O. Levinson, M.D., and Robert Finkelstein, Samuel Deutsch Convalescent Center, Michael Reese Hospital, Chicago, in *American Journal of Nursing*, January, 1942, pp. 35-39.

Human Health and Animal Health

From the dawn of civilization right down to the present time, the obligation to maintain the health of its domestic animals has remained one of the most essential responsibilities of society. The great catastrophes that have overtaken tribes, nations and even whole continents throughout the ages have been due, in no small part, to a failure to discharge this obligation. The extent to which even profound students of medical history have overlooked the obvious relation between animal plagues, famine and human pestilence through the ages is truly remarkable. An example of this is illustrated in the excellent work (*Rats, Lice and History*) of the late Hans Zinsser. It is largely an extended catalogue of dire pestilences that swept across Europe in great waves, one after another, for 1500 years, each destroying hundreds of thousands of lives. Again and again he has mentioned that the pestilences were preceded by famines; but nowhere did he mention that the famines were caused by animal plagues and that thus this enormous loss of life was due to the failure of society to discharge its primary obligation to maintain the health of its domestic animals.

There has never been a time when it was so essential that every effort be made to guard against animal plagues as now.

In Great Britain seven ounces of calcium carbonate are added to every 280 pounds of wheatmeal flour which is the flour now used for bread in that country.

Tolerance of joints, muscles, and connective tissues for powdered sulfanilamide, sulfapyridine, and sulfathiazole is good. Because of greater solubility, Kay and Frankel in *Annals of Surgery* say they prefer sulfanilamide powder to either of the others.

M. T. Lewis, of the Pennsylvania State College,* has developed a new agar medium to replace the banana-agar medium used in the culture of *Drosophila melanogaster*—and to date it appears to be superior to the banana medium. The main constituent is tomato paste, but to this are added water, corn syrup, agar-agar and Moldex.

Baker of Duke Medical College reports of 242 fresh compound fractures treated surgically with local application of sulfanilamide, 192 healed without infection and 50 developed post operation infection. Of 28 similar injuries treated with sulfathiazole only three developed any infection. "It appears that infection is due to improper débridement and lack of restoration to normal anatomical relationship rather than to the type of injury or to the drug used."

Local Use of Sulfonamide Drugs

Osgood deduces from controlled quantitative studies by the method of human marrow culture that in equal concentrations sulfathiazole is more effective than sulfapyridine, sulfadiazine or sulfanilamide against any of the common pyogenic organisms and that sulfanilamide is the least effective. In concentrations attained in a saturated solution in a medium similar to tissue fluid, sulfathiazole and sulfanilamide are superior to sulfapyridine and sulfadiazine, and sulfathiazole is much less toxic to living human cells in this concentration than is sulfanilamide. None of these drugs are very effective against large numbers of organisms in any concentration attainable. —*Jnl. A. M. A.* 120:4, p. 318.

* Paper 1104 in Jn'l. Series of the Pa. Agri. Expt. Sta.

Use for Heparin

That inflammation resulting from X-ray damage to the lungs may be prevented, or at least much reduced in severity by the use of heparin, has been announced by Drs. Floyd Boys and Ivar David Harris of Charlottesville, Va. Previously they had found that heparin prevented adhesions which sometimes follow operations.

For Mustard Gas Burns

Glycerine is included in the antipruritic ointment for mustard gas burns, recommended by the OCD as a constituent of the special first aid chest for gas casualties. Used to relieve itching following mustard burns, the ointment consists of: :

Benzyl alcohol	50	percent
Stearic acid	30	"
Glycerine	10	"
Ethyl alcohol	8	"
Pontocaine	1	"
Menthol	1	"

Ticks on Birds Suggest Winged Carriers of Fever

Aerial spread of two dangerous diseases, tularemia and Rocky Mountain spotted fever, is now suspected as a result of a discovery by Charles R. Joyce, Iowa State College entomologist, and Gaines W. Eddy, now of the U. S. Bureau of Entomology and Plant Quarantine. It was found that the nymphs and larvae of the common rabbit tick appeared on 29 kinds of birds examined at the Tama Indian Reservation. Although rabbit ticks rarely attach to man, and are therefore not directly responsible for transmitting the diseases, it is believed they spread the diseases among rabbits. From this reservoir of infection the diseases may spread naturally to other species of ticks, such as those which carry spotted fever. On one brown thrasher the entomologists found 495 young rabbit ticks, and 2,111 were removed from 24 of these common song birds. Hosts for the young rabbit ticks were found to include also the catbird, indigo bunting, wrens, towhee, robin, and other species of ground-feeding birds. —*Science.*

New Process Saves Vitamin C

Vitamin C is one of the valuable food elements in milk but it is also one of those most easily destroyed, says the National Dairy Council. Sharp, Guthrie, and Hand at Cornell University have spent several years working on the important problem of the preservation of this vitamin in milk.

They state that if the vitamin C originally present in milk and milk products which enter human consumption were preserved, it would approximate that in half the citrus crop of the United States. If the vitamin C which is present in freshly drawn milk were preserved, one quart of milk would contain an amount of vitamin C equivalent to the juice of one orange. When viewed in the light of these facts, the preservation of vitamin C in milk is important from the standpoint of the milk industry and of the nutrition of the nation.

Contact with Air Destroys Vitamin C

Many determinations have been made of the vitamin C content of milk at all points during the process of moving milk from the cow to the consumer. The amount of vitamin C appears to vary indirectly with the amount of air present in the milk. As more and more air comes in contact with the milk the vitamin C content dwindles.

In cooperation with another experimental study which was being carried on at Cornell University, Sharp, Guthrie, and Hand developed a method of removing air from milk during the pasteurizing and bottling processes. The vitamin C content of milk so treated was about 80% of the amount in freshly drawn milk. This showed that milk could actually be pasteurized and bottled without loss of vitamin C (except for that occurring between the time of milking and delivery to the milk plant).

Air Can Be Removed from Milk in Commercial Plants

These workers have continued their studies and have almost perfected a process whereby air may be removed from milk during pasteurization. By this procedure the vitamin C content of freshly drawn milk is retained approximately 80%, points out the National Dairy Council. Methods for the use of this process in the commercial milk plant are now being developed. Difficulties with equipment caused some trouble at first but most of them have now been smoothed out so that this process can actually be used during commercial pasteurization and bottling of milk.

Pectin Infusion for Shock

The use of pectin as a blood substitute for raising circulatory volume in shock is being used with favorable results at the Henry Ford hospital in Detroit. A 5% solution is used. This concentration is nontoxic, non-antigenic and is retained in the body but a short time.

Pectin is inexpensive and easily obtainable. However in preparing the solution for use, pH, viscosity, hemolytic properties and other factors must be carefully adjusted.

Research workers at the Wisconsin station have developed three general groups of strains of sweet clover. These are being hybridized with the idea of incorporating the advantages of all three groups into one or more improved varieties. Selection has been made of a sweet clover containing about one-fifth the usual amount of coumarin. This makes the crop non-poisonous should there be spoilage when it is made into hay and of course more palatable because it is less bitter. With such improvement sweet clover should become a much more valuable crop than it is at present.

Japanese Cavalry Estimated at 69 Regiments

"The most recent information relative to Japanese calvalry is that they have twenty-five regiments—eight regiments of non-divisional cavalry, organized into brigades, and seventeen regiments of divisional cavalry. Reliable but unconfirmed information, however, indicates that Japan now has approximately sixty-nine infantry divisions and that the divisional cavalry has correspondingly been increased to sixty-nine divisional cavalry regiments. Moreover, recent Russian translations state that the Japanese expect to build up large forces of cavalry, heavily reinforced, to be used as independent cavalry."—*Nat'l. Horseman.*

Trappers and gold seekers found the Indians of the great plains living on Buffalo meat

The Renaissance of Jerky

When explorers and trappers traversed the Great Plains and the far Northwest, like the gold seekers bound for the West Coast and the soldiers that soon spread over that vast area, they found the savage Indians living to a considerable extent upon buffalo meat preserved by drying in sunshine. All these white men perforce adopted this custom of storing meat in time of plenty for the inevitable season of scarcity and largely discontinued it as soon as they were able to do so.

After two generations of culture, this lifesaver of the pioneer reappeared under the stress of World War I, as dehydrated beef. However with the overcoming of the submarine menace and the early establishment of a less critical shipping situation it did not get far, and in the main the A.E.F. received its beef in quarters or cans with its moisture content intact or even supplemented from the town pump.

Now again with cargo space or the lack of it causing more headaches than anything else, the desirability of transporting all food minus its natural water content is to the fore again. In the past decade much has been learned about dehydrating vegetables, fruits and meats. The products do not even resemble the dried apples, peaches and green corn of our grandmothers nor the jerky of the pioneers. They are far removed from the commercially dried fruits of recent times. Science has replaced empiricism in an effort to retain in the products the flavor, aroma, to a considerable degree the color and in some measure the texture available for restoration upon the simple addition of water. Oddly claims of achieving these ends for meat products were first made for canned dog food.

The development of dehydration for fruits and vegetables is not only more complex than similar treatment of meat but is considerably further advanced. The War Department has already ordered 18,000,000 pounds of such products for overseas troops. The dehydration of meat for human consumption is being experimented with at several of the large packing plants and at the U. S. Experiment Station at Beltsville, Md. At present a moisture content of 6 to 8% and a fat content not in excess of 25% seems desirable. Vacuum drying, required for fruits and vegetables, appears to be unnecessary for meat. The best results have been obtained with meat that is first cooked and then coarsely ground before drying. When reconstituted it is suitable for meat loaf, patties, stews and any use that can be made of ground fresh meat.

Several explanations are offered for the use of the word "jerky" for dried meat; the most common being it is a corruption of "jerked," from the manner in which the long muscles are obtained from the carcass

for drying. However that leaves unexplained the use of a phonetically very similar word "querque" by gauchos on the Argentine Pampas who are separated from the western pioneers by a century of time and a distance of 6000 miles.

One veterinary officer recently assigned to the School of Meat and Dairy Hygiene for a course of instruction credits "jerky" with obtaining this desirable assignment for him. His explanation follows:

In certain sections of the Southwest a home-made dried beef called "jerky" is made by native ranchers. Knowing this product to be quite a delicacy, I procured several pieces and kept them in the tent.

Our headquarters are rather makeshift and furniture is scarce. The surgeon and I share a small table together.

Each morning about 10 o'clock I would go down to the tent and bring a piece of jerky back to the office and proceed to eat it with much enjoyment. Jerky is quite hard and dry and it is therefore necessary, in eating it, to seize it firmly between the teeth and to jerk in the opposite direction with both hands. This procedure could not fail to attract the surgeon's attention. He immediately wanted to know what it was and where I got it. I told him it was jerky, which was true. I also told him that I bought it at a corner store of a nearby Indian town, which, incidentally, had a bad reputation from a sanitary and hygienic standpoint. The statement as to where I got the jerky was untrue, since I wanted to see what his reaction would be. He examined and smelled the piece carefully, then making a wry face handed it back. He asked if I knew how it was made and I professed ignorance in order to see what would develop, whereupon he told of its manufacture. According to him the Indians acquired the meat from the carcasses of dead cows and hung the strips up so the flies and maggots could work them over, and after the proper stage of cure was reached, as indicated by green pus and mold development, the pieces were taken down, pounded out flat, and became a delicacy ready for use. Each time he described a phase of the process I jerked loose another strip and chewed it with much relish. Needless, to say, he became quite disgusted.

Not long afterwards, the commanding general asked for the submission of the name of a veterinary officer for detail to the meat inspection school. I submitted the name of a brother officer. The next morning the surgeon informed me that the general had decided to send my name instead. I rather suspect that the surgeon persuaded the general to have me sent.

Brucellosis among handlers of livestock may be on the increase. Ten cases were reported from a small community within 18 months. Eight patients were treated with sulfanilamide or sulfapyridine with good results.

* * * *

"Keep your powder dry" is equally applicable to the new dried meat powder of which a first order for $100,000 of the beef product has been placed by the government. As available shipping space dwindles, the government is calling for an increased amount of dehydrated food. Milk and eggs for some time have been dried in large quantities. This new dehydrated meat product, dried meat powder, has just been developed at the Beltsville Research Laboratory in collaboration with the American Meat Institute. Powdered beef, mutton and goatsmeat have been made successfully but pork is giving some trouble on account of the excessive fat.

* * * *

A Need for Veterinary Food Inspection

An American ambassador to one of the principal countries of Europe was given the following "don'ts" by the Embassy Physician on reaching the foreign capital in 1936:

Until you are here long enough to be immunized—

"Don't drink unboiled water."

"Don't drink milk or cream."

"Don't eat any milk products of local origin."

"Don't eat raw vegetables."

"Don't eat canned vegetables unless you know they are from the U.S.A."

"Don't eat raw or underdone meats."

"Don't eat *any* sausages."

"Don't eat gefullte fish."

"Be very careful about all other fish, tapeworm is very prevalent in Europe."

These directions were for the guidance of the Ambassador when attending official and other banquets and dinners. The American Embassy in that country maintained its own commissary supplied direct from the U.S.A.

The Suppression of Brucellosis In Iowa

By DR. C. C. FRANKS
State Veterinarian

IT has been only a few years since our cattlemen complained that we had little to offer them for combating Bang's Disease and we were quite frank to admit this to be true. The situation today is quite different and we say with only slight reservation that in the test and slaughter method, this method plus vaccine, vaccine alone or a judicial combination, a plan may be formulated which will offer a solution to any arising from Brucellosis infection.

Much has been accomplished, as we all realize, in the control and eradication of animal diseases, but in none of these has there been such versatile weapons as we now have in attacking Brucellosis. It is truly within the province of the veterinarian to determine the weapon or combination of weapons most appropriate.

We are aware of Brucellosis infection in untold numbers of herds which have yielded to the test and slaughter method, also of other instances where the results have not been satisfactory, since the infection may lurk—who knows where. In such circumstances the essential thing may be to raise the resistance of the cattle vaccination in the proper aged bracket. When animals in the herd no longer abort from Brucellosis infection we believe that the disease in that herd will cease to spread to any considerable extent, and when a test is applied, the offending animals may be removed and the disease brought under control.

In Iowa we have many pure bred herds and Bang's Disease in them may be quite a problem, because the owner, who is financially interested, does not want to take the loss and the members of his breed association are reluctant to see the blood line sacrificed. Nevertheless, these men for the most part have come to realize that it is unwise and frequently disastrous for the Bang's Disease infection to continue in a herd. Some of these men have their cattle tested and take the jolt. Others ask for the test plus the vaccination of the calves, while still others follow the vaccination program but plan on raising the resistance of the vaccinates, and thus in time having a herd that will have been vaccinated as calves and negative as adults. Vaccination beyond the age of 8 months is not condoned, officially.

Far be it from us to lay down a blanket rule that will cover each case in its category. We feel that the owner should be made acquainted with the advantages and disadvantages of the methods that are available to him. When this is done, we are sure he will realize there is no quick and sure relief from the infection of a disease that may have existed on his premises for years, but that if he pursues a course which is adaptable to his situation, in all probability he will be satisfied with the ultimate results.

As veterinarians we must not overlook the fact that, to determine if immunity is being established in an animal, there should be a post-vaccination test at about 30 to 40 days, and that if the animal proves negative, it should be immediately revaccinated. We feel that too often it has occurred from some unexplainable reason, perhaps too much heat, cold, or age; perhaps the vaccine was impotent or the animal mechanism may not, at the time of vaccination, have been in a receptive mood for a take, and had not the post test been made, one would be inclined to discredit the ability of the vaccine to produce immunity. Immunity can be established only by potent vaccine and there is no other way to determine this factor except by the test 30 to 40 days following vaccination.

We do not know of the problems that may confront veterinarians in other sections of the country. What is said here applies only to the situation in Iowa as we see it.

* * * *

In 1896 *Brucella abortus* organism was found by Bang responsible for contagious abortion in cattle. In 1914 *Brucella suis* was recovered from swine.

Veterinary Service for the Livestock Industry in War Time[1]

By W. J. BUTLER
State Veterinary Surgeon
Helena, Mont.

THE Four Horsemen of the Apocalypse are riding rampant throughout most of the world. This dictators' war has brought death, plague and hunger to the four corners of the earth. It is not my mission to speak to you of military tactics or strategy or even of human plagues. It is my duty, however, to bring to your attention very forcibly that so often forgotten factor—disease of livestock.

It is well known that during war diseases are more prevalent than during peace. This is due to four main factors: (1) disorganization of disease control forces during general mobilization (2) sabotage due to fifth columnist activities (3) general movement of troops and animals accompanying them during military maneuvers and (4) the return of troops and equipment from countries where dangerous livestock diseases exist.

Bisschop of South Africa has made the very definite statement that—

"It is no exaggeration to say that the animal industry depends for its very existence primarily upon its veterinary organization; i. e., upon the ability and success of the state veterinary service in combating infectious diseases, sterility, deficiency conditions and plant poisons."

This fact has been recognized by the Procurement and Assignment Service for Physicians, Dentists and Veterinarians of the Federal Government. Every veterinarian in Montana has been sent a questionnaire by this service of the Federal Government and I am quite certain that each has signed and returned it, offering his services to the Government in the capacity for which it thinks him best fitted. Under the present method all veterinarians called for military duty will be cleared through the State Committee on Veterinary Medicine for the Procurement and Assignment Service. Due to this timely recognition of the importance of the veterinary service, as a protection for the livestock industry and assurance of an adequate food supply, it is unlikely that the veterinary service of the United States will be disorganized during the present war. However, several Montana veterinarians, including two of our laboratory personnel, are now in the armed forces.

We know definitely that our enemies are considering the use of disease, both human and livestock, to gain victory for themselves. Captain Meyer of the German Army has stated:

"The country that discovers the most virulent microbe for scattering over the enemy and that has the most effective vaccine to protect its own self, will be victorious."

The Japanese have employed disease as a measure for gaining their objective. They have introduced livestock disease in war-torn China to cut down the food supply of their enemies. It is the opinion of some investigators that the outbreak of foot-and-mouth disease that occurred in the United States in 1914 was deliberately introduced in an effort to keep us out of the first world war. Fortunately the outbreak was suppressed, but at an enormous cost. Although we do not know definitely that this 1914 outbreak was due to sabotage, we do know that our enemy on several occasions, endeavored to introduce foot-and-mouth disease into this country after we entered the war. Through the vigilance of our federal authorities these plans were frustrated.

Colonel D. M. Campbell has made the following statement:

"The possibilities of microbic warfare are so full of unknowns that the science of bacteriology should not fall asleep under the anesthetic of fancied security. Eleven 'fifth columnists' were sentenced to death in Russia in 1938, for 'systematic weakening of agriculture by causing the death of 90,000 cattle.' This was done by bacteriological sabotage."

It is a well-known fact that much of the hunger of Europe today is due to the preva-

[1] Address at the annual meeting of the Montana Stockgrowers Association, Helena, Mont., May 22, 1942.

lence of disease in livestock. A well organized, efficient veterinary service is the chief deterrent to the spread of animal plagues through sabotage. As the prospect of success in an attempt to destroy our livestock by means of plagues diminishes the likelihood of its being attempted decreases.

The third factor to be of any serious consequence in the United States would mean that we would have been invaded by enemy forces and that, we fervently pray, will never happen.

The fourth factor, the return of troops and their equipment after the war, is full of potential dangers. These troops will return from countries where dangerous animal plagues are prevalent that do not now exist in this country. Equipment, souvenirs, pets, mascots and the many things that will be brought home with our troops might very easily carry in the infection of some of these dangerous foreign diseases. Naturally federal disease-control forces will use every effort to see that proper disinfection is applied to materials wherever indicated. Personally I fear the danger from such importation of disease even more than I do the dislocation of veterinary forces or of sabotage. The period of rehabilitation will not be without its problems for veterinary service and for the livestock industry.

As a nation, for many years we have lived in fancied security. Any notion that we had about isolation was removed from our minds on the morning of December 7th. Stockmen and their veterinary service must be continually on the alert so that we shall not again be taken unaware as at Pearl Harbor.

Growers of livestock are conversant with the dangers of foot-and-mouth disease, but unfortunately there are other diseases in Europe and in the Orient that are far more deadly. I refer particularly to rinderpest, contagious pleuropneumonia, surra, equine piroplasmosis, epizootic lymphangitis, etc.

History records countless instances of disaster to whole nations that has followed an outbreak of one or another of these scourges of livestock. Take rinderpest for example. For 2000 years it ravaged the herds of Europe and Asia. Thirty million head of cattle died from it in Germany alone during the first half of the 18th century. In a single outbreak it destroyed three million cattle in Italy. The same disease wiped out the whole cattle industry of Egypt in a single year, an industry that had been a century in building. Outbreaks of rinderpest have caused uncounted, widespread famines in the Orient—famines in which hundreds of thousands and even millions of persons have starved to death; for in those lands it

Trading post in the range country. Thousands of animals are grazed over wide areas. A disease may get a long start before it is realized

destroys not only the food animals but the oxen and water buffalo with which the soil is tilled and brings about crop failure as well. Down through the ages until a scientific veterinary service was established in Europe 175 years ago and rinderpest was brought under control, it dogged the footsteps of all armies and even yet it lurks in byways ready to spring upon the livestock industry whenever the veterinary service of a country is disorganized by war. Many countries of Europe suffered costly outbreaks at the close of World War I. Rinderpest was the No. 1 handicap to agriculture in the Philippine Islands until the coming of the American Army and its complete eradication by the veterinarians of the Army and of the civil population after a struggle lasting a quarter of a century.

Speaking of an outbreak of rinderpest within the memory of many of us, Edmunds says:[1]

"Gray identified the disease and reported upon it early in 1896 and by March of that year it was in Bulawayo, from whence it spread far and wide, leaving a never-to-be-forgotten stinking desolation behind it. The country was full of cattle and big game, both

[1] Edmunds, C. R., 1922. Diseases of Animals in South Africa, p. 419.

of which the disease decimated; it destroyed about 97% of the cattle. Khama estimated his losses in Bechuanaland at one million head, and as the Metabele were richer in cattle than Khama, it is probable the losses in Metabeleland were a million and a half. The only means of communication between Rhodesia and the south was by road, and all along this were the carcasses of rotting dead animals; in consequence, one unending stench stretched from Bulawayo to Palapye.

"Naturally, once the disease had invaded Rhodesia, the news of its nature and the rapidity of its spread caused great alarm in the southern colonies. The death of 20,000 cattle at Vryburg *en route* from Bulawayo to Capetown further increased the consternation. Various attempts to check its progress south were made, including the erection of fences, but to little purpose. In 1897 the Transvaal lost 980,000 head and the Cape Colony losses in 1897 and 1898 were estimated at 1,300,000 cattle."

The history of surra, of certain trypanosomiases and even of anthrax is almost as bad. This record is cited not to alarm you but to illustrate the disaster that must inevitably engulf the livestock growers of the United States if for any reason they are deprived of the protection of the veterinary service of the nation.

The veterinary service of the United States can control effectively the diseases which we now have in this country. These diseases cause a tremendous loss, but they can be controlled and eventually they can be eradicated in an economic and practical way, as has been amply demonstrated by the national campaign to control and eradicate bovine tuberculosis. However there are many destructive animal plagues in other parts of the world whose control would tax the resourcefulness of our veterinary service, even were it not depleted by the requirements of the armed forces.

As has been outlined to you on previous occasions brucellosis of cattle, which causes a great loss to the livestock industry, can be controlled under range and semi-range conditions by good cowmanship alone. However, it can be more quickly controlled through blood testing of breeding animals in definite areas together with calfhood vaccination and with the segregation or slaughter of infected animals.

Individual losses from various diseases will occur and in a number of instances these losses will be very costly to the individual, however, there should be no widespread outbreak or loss from microbian diseases in the United States from any of the native diseases of livestock. In order to guard against outbreaks of disease, either native or foreign, I cannot urge too strongly that stockgrowers report immediately to their veterinarians or to the livestock sanitary board the appearance of any dangerous disease condition in their livestock. Outbreaks of diseases, if reported immediately, usually can be effectively controlled in a very short time. If they are not reported and diseases get a good start, then they may get out of all control. Veterinary science has provided vaccines for many microbian diseases which are effective.

Sometimes stockmen forget that all of these various vaccines that protect our livestock have been developed and perfected by veterinarians. Vaccines don't just happen and they are not developed overnight. To develop a safe, potent vaccine usually takes years of sweat, toil, sickness and in some instances, death, together with exacting work on the part of the research workers as well as field veterinarians. I do not know of a single veterinarian or veterinary service organization that has produced a vaccine for their own selfish gain. In all cases they have given the vaccine to the world for the benefit of the livestock industry.

At the present time we suffer considerable loss of livestock from what we may term "nutritional conditions." We have bred up our livestock genetically without taking into consideration the prevailing feed, environment or conditions. We are now breeding animals that mature much faster than the old range animal. Some of these animals develop into maturity so rapidly that the natural feed they obtain does not contain sufficient vitamins and mineral salts for the

quickly maturing body. Probably the most important deficiency we have to contend with in this state is that of phosphorous. For many years authorities in Montana have advocated the feeding of bone meal or other phosphorous supplements to livestock. Each year it seems more essential to supply phosphorous either in the form of bone meal or defluorinated rock phosphate. Bisschop has reported that in phosphorous-deficient areas in South Africa the average live weight of animals can be increased 24%, the length of the body 5.5%, the depth of chest 7.5%, the length of the rump 4%, and the heart girth 5.5% by supplying a ration adequate in phosphorus.

In definitely phosphorous-deficient cases bone meal should be fed straight. Where animals which were deficient in phosphorus have come back fairly well to normal and in areas where deficiency is not so marked bone meal may be mixed with salt. If the defluorinated rock phosphate is used it may be mixed with water, fed alone, or mixed with salt.

It has been said that the cutting gate is one of the best friends that a sheep man has. That applies with equal force to the cattle grower. It has been our observation that in certain areas of Montana we are again overstocking our ranges. It would appear that this fall is the time to use the cutting gate and cull out the least desirable animals. Our country needs beef and our cattle should be fat this fall if present favorable grass conditions continue. Wisdom dictates that our carry-over of livestock this coming winter should be governed by our available feed supply. It would appear that this fall and winter, of all times, we should not gamble with the weather and a limited supply of hay.

Whether it be our lot to serve in the front-line trenches or to produce food for our armed forces, we must work unselfishly and to the best of our ability. Our country comes first. Without our country we will have neither family nor freedom nor anything else worthwhile for which to live. Sometimes it is more difficult and more depressing to stay at home than to be in the armed forces. Whether we ride into the valley of the Seven Hills from the front-line trenches or whether it is our mission to stay at home to supply food, each must do his bit unselfishly and unstintingly. The activating motive must be love of country and not love of gain.

Eighty-one years ago in the dark days at the beginning of the Civil War, Dr. Oliver Wendell Holmes, Parkman Professor of Anatomy and Physiology at Harvard University, addressed the medical class and ended his introductory lecture, published at the request of the class, as follows:

"It is time to bring these crowded remarks to a close. The day has been when I should have thought it fitting to exhort you to diligence and entire devotion to your tasks . . . it is not so now. The young man who has not heard the clarion voices of honor and of duty now sounding throughout the land will heed no word of mine. In the camp or the city, in the field or the hospital, under sheltering roof or half protecting canvas or open sky, shedding our own blood or stanching that of our wounded defenders, whatever our calling and our ability, we belong, not to ourselves, but to our imperiled country, whose danger is our calamity, whose ruin would be our enslavement, whose rescue shall be our salvation!

"You cannot all follow the armies of your country to the field. But remember that he who labors for the general good at home is an ununiformed soldier in the same holy cause with those who bear arms or minister at the side of the ambulance and in the camp hospital. . . .

"It does not matter very much that someone else evades his obligations; each must live with his own conscience, and those who have none are missing something. Patriotism is what you *give*, not what you get; what *you* give, not what the other fellow gives or withholds. And, if it should turn out, as it may in a topsy-turvy world, that he gets the plums and you get the husks—well, a good doctor can lead a useful and satisfying life, any time and anywhere, without plums; and the plums that were not earned are apt to be rather sour and wormy. Here is a wise choice."

These stirring words of the famous author-physician apply to each of us today as it applied to the class at Harvard in 1861.

The Geographical Distribution of Bovine Trichomoniasis*

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Dark areas indicate countries which have reported bovine trichomoniasis

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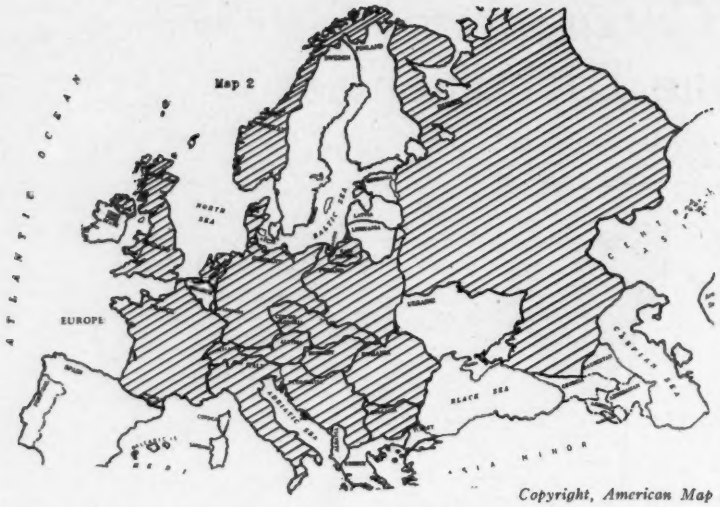
THE rapid expanse of knowledge concerning bovine trichomoniasis has grown in large proportions since 1928. Over 300 papers in several languages have been published on this disease, many of which are review articles. Since the literature has become so widely scattered and many papers not readily accessible, a summary of various discussions is justified. No organized attempt has been made, prior to this paper, to show the extent and geographical distribution of this disease, especially throughout the world. The purpose of this paper is to present a world distribution of bovine trichomoniasis illustrated by maps with the hope that it can be of material aid to research workers as well as of general information for veterinarians, livestock owners, and other interested persons.

Trichomonads in the genital tract of cattle were first discovered by Mazzanti (1900) in Italy. Two cows and one heifer were slaughtered because of permanent sterility. Postmortem examination revealed trichomonads, the heifer having a trichomonad pyometra. Mazzanti concluded that the trichomonads were responsible for the permanent sterility of these cows. He proposed the name *Trichomonas utero-vaginalis vitulae* for this organism. Since Bang's discovery (1897) of the bacteria causing contagious abortion was gaining favor and occupied the attention of research workers, Mazzanti's findings did not receive recognition until several years after they were reported. Riedmuller (1928) proposed the name *Trichomonas foetus*, as the trinomial name proposed by Mazzanti was not acceptable. This name is generally accepted by the majority of workers.

Bovine trichomoniasis is widely distributed throughout the world with 23 countries reporting the disease; namely, United States, Mexico, Canada, Puerto Rico, Northern Ireland, Scotland, England, Wales, France, Netherlands, Denmark, Norway, Germany, Switzerland, Italy, Austria, Hungary, Rumania, Poland, Czechoslovakia, Russia,

* Published with the approval of the Director of the Wisconsin Agriculture Experiment Station, Project 622-V; Trichomoniasis and other reproductive diseases of cattle. B. A. Beach (In Charge), W. Wisnicky, cooperating.



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Diagonal marked areas indicate European Countries which have reported bovine trichomoniasis

South Africa, and Japan. See maps 1 and 2.

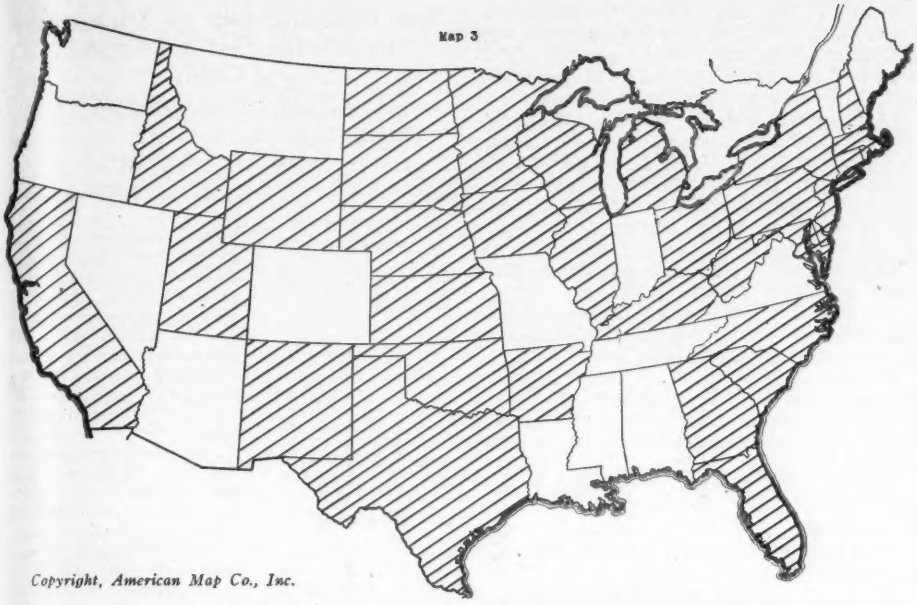
The disease has been reported from Germany by Riedmuller (1928-1932), Abelein (1932), Kust (1934), Daust (1934), Drescher and Hopfengartner (1933), Brauer (1935), Heitgrek (1935), Niebrier (1935), Holstein (1934), Schuman (1936), Sontgen (1935), Wagner and Greve (1935), Eickman (1937), Sachweh (1937), Euler (1937), Siegel (1936), Zurn (1936), Beller and Schaaf (1938, 1939, 1940). This list is not necessarily complete. To keep the bibliography within reasonable limits, it is suggested that readers consult general review articles on bovine trichomoniasis given at the end of this paper.

Abelein (1932) and Staub (1936) have reported the disease from Switzerland. It was also found in Austria by Abelein (1932) and Benesch and Wirst (1936). Blaschke (1936) discovered the first cases of bovine trichomoniasis in Czechoslavakia. Olbrycht (1937) found trichomoniasis for the first time in Poland and Bourdie (1936) in France. Jensen (1937-1938) and Madsen (1937) reported trichomonad abortions from Denmark and Hellesnes (1937) from Norway. Rajacevic and Okljesa (1936) and Pavsic (1939) found the disease in Yugoslavia. Alexandru and Dumitru (1937) and Pop and Ogneru (1937) reported *Trichomonas foetus* from Rumania. DeBlieck and Bos (1936) reported trichomoniasis from the Netherlands. Meszaros (1936) discovered the disease in Hungary, Rumyantsev (1936) in Russia.

Since Mazzanti's original report in 1900 the following have found trichomoniasis in Italy: Agostinelli-Scipioni (1934), Campiglio (1936), Senna (1936), Paribocci (1937), Battaglina (1938), Asdrubali (1939), Menzani and Giacomoni (1939), and Zeetti (1940). The disease has been reported from Mexico. Futamura (1935) was first to report the disease from Japan and later Neshimura (1936) and Morisita (1939) reported more cases. Van Volkenberg (1937-1939) reported *T. foetus* from Puerto Rico.

Kerr and Lamont (1938) reported *T. foetus* from Northern Ireland. From Great Britain; Nicholson and Menzies (1938) reported *T. foetus* from Somerset; Stableforth and Scorgie (1937) from Cambridge, Bucks, Wilts, and Hampshire; Pritchard (1937) from Sussex. Robinson (1937) reported *T. foetus* from South Africa. According to O'Dea (1939) Cameron has reported the disease from Canada.

From the United States, Emmerson (1932) first reported *T. foetus* from Pennsylvania. Since Emmerson's finding, bovine tricho-



Diagonal marked areas indicate states which have reported bovine trichomoniasis

moniasis has been reported from the following 32 states: California, Cameron (1938), Schwartz (1938); Connecticut, Gilyard (1934), Schwartz (1938); Delaware, Schwartz (1938); Florida, Schwartz (1938); Georgia, Schwartz (1938); Idaho, Schwartz (1938); Illinois, Graham (1935), Levine, Brandly, and Graham (1939), Schwartz (1938); Iowa, McNutt, Walsh and Murray (1933), Walsh, McNutt, and Murray (1934), McNutt, Blohm, and Barger (1939), Schwartz (1938); Kansas, Alson (1939), Schwartz (1938); Kentucky, Schwartz (1938); Maryland, Andrews and Miller (1936-1938), Andrews, Kerr, and Porter (1935), Andrews (1938), Rees (1938), Andrews and Lyford (1940), Poelma and Daniels (1940), Schwartz (1938); Minnesota, Boyd (1937), Karlson and Boyd (1941), Schwartz (1938); Nebraska, Schwartz (1938); New Jersey, Hagenbuch (1935), Andrews and Miller (1938), Schwartz (1938); New Mexico, Schwartz (1938); New York, Cameron, Fincher, and Gilman (1933-1934), Cameron (1935), Fincher (1933), Gilman (1939), Schwartz (1938); Ohio, Lothe (1935), Case and Keefer (1938), Schwartz (1938); Oklahoma, Schwartz (1938); Pennsylvania, Emmerson (1932-1935), Wenrich and Emmerson (1933), Schwartz (1938); South Carolina, Anderson and Le Masters (1939), Schwartz (1938); Texas, Schmidt (1937), Schwartz (1938); Utah, Madsen (1938), Hammond and Jensen (1938), Madsen and Jensen (1940), Madsen (1941), Schwartz (1938); Wisconsin, Beach (1935-1937), Lothe (1929*-1935) Morgan (1941), Schwartz (1938); West Virginia, Schwartz (1938); Wyoming, Schwartz (1938); New Hampshire, Martin (1935), Waller (1941); Massachusetts, Hagenbuch (1935); South Dakota, Lip (1935); Arkansas, Stubbs (1935); Michigan, Schwartz (1938); North Carolina, Schwartz (1938); and North Dakota. See map 3.

Research on the incidence of *T. foetus* in Wisconsin will be published in a later communication.

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* Lothe (1929) in an article entitled "The breeding efficiency of a herd of cows negative to the agglutination test for abortion." *Jnl. A. V. M. A.* 28, pp. 150-172, reported a typical trichomonad history in a large herd.

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Symptoms and Control of Trichomoniasis

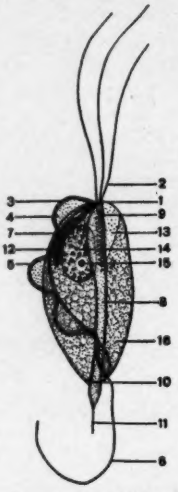
As a result of infection with *Trichomonas foetus* one of several things may occur—the animal may fail to conceive; conception may take place and be followed by abortion; the fetus may die and instead of being expelled may become macerated, while the uterus becomes filled with a characteristic thin, grayish-white, almost odorless fluid; or a normal gestation and birth may occur.

There is no specific medicinal treatment for infected animals, and the disease should be handled like any other form of genital infection of cattle.

Cows that, as a result of trichomonad infection, fail to conceive after repeated services should be given sexual rest until after two or three normal estrual cycles. They should receive such treatment as a veterinarian recommends. — *Keeping Livestock Healthy*, 1942 Yearbook of Agriculture, U. S. Department of Agriculture.

The Pathogenesis of Trichomoniasis in the Genital Organs of Cattle

The injection of pure cultures of Trichomonas into the sheath of a bull caused the transmission of the infection, as did also yoking with an infected animal.[32] Con-



Diagrammatic drawing of protozoan *Trichomonas foetus* (Riedmuller): (1) blepharoplast; (2) anterior flagella; (3) posterior flagellum as margin of the (4) undulating membrane; (5) accessory filament in the undulating membrane; (6) posterior free flagellum; (7) costa; (8) axostyle; (9) endoaxostylar granules in the capitulum of the axostyle; (10) chromatic ring about the axostyle at point of emergence from the body; (11) terminal spine of axostyle; (12) parabasal body; (13) cytostome; (14) nucleus; (15) caryosome; (16) undifferentiated cytoplasm. From *Wenrich and Emmerson, 1933.*

firming a diagnosis of infection by means of culturing or microscopic examination is rather uncertain and gives irregular results, but in spite of this the fact remains that healthy cows acquire the disease by association with infected animals. Clinical symptoms were evident in the bull by catarrh of the sheath with follicular infiltration; capacity for work was unchanged.

Trichomonas cultures injected into the vagina cause an infection of the uterus, but their presence has not been regularly observed in the vaginal mucus. The existence of trichomoniasis infection does not prevent regular gestation. Trichomonads may live on the uterine mucosa during gestation without provoking any macroscopic change in the fetus. Intravaginal infection may in itself cause abortion. Coexistence of granular vaginitis neither facilitates nor prevents the development of trichomoniasis; the two infections may coexist under natural conditions.

[32] Beller, K., J. Schaaf, and H. Scherle, 1938. L'action pathogene des Trichomonas des organes genitaux des bovins. *Arch. f. Wissensch. u. prakt. Tierheilk.* 73:3, pp. 171-187. Abst. in Rec. de Méd. Vet. d'Alfort, 115:8, p. 485.

Treatment of Wounds in Army Animals*

THE treatment of wounds constitutes a large part of the veterinary officer's service with animals. In the report of the Surgeon General of the Army for the year ending June 30, 1941, admissions to the veterinary sick and wounded register as a result of "violent and accidental causes" exceed those for all other causes combined; their number being 13,214. These injuries were responsible for 244,227 days lost. Ninety-five percent of these ailments and 96% of the days lost were due to injuries of the nature of wounds or contusions. This is equivalent to one injury, serious enough to put the animal on sick report, for each two animals in the army and to 9⅓ days on sick report for each of the 25,000 animals possessed by the army in 1941. If all traumatic injuries in which there was no break in the integument are eliminated from these totals there are still left 8,761 open wounds and 162,000 days lost from service because of them, or the equivalent of one horse or mule in three wounded and 6½ days lost for each animal in the army. This takes no account of the many traumatisms that required incision in the course of treatment and thus became open wounds.

Although the foregoing illustrates the great opportunity that the veterinary officer has to conserve the animal strength of the army by skillful treatment of wounded animals, even these figures do not tell the whole story as the fiscal year ending June 30, 1941, was a year of peace and of relatively small army maneuvers. The use of animals in the field increases very largely the number and proportion of injuries due to violent causes. It might not increase the proportion of such ailments in the field in time of war but would largely increase the rate. During the Louisiana maneuvers in 1941, admission to the sick and wounded register of the 30th Veterinary General Hospital totaled more than 1900 in 50 days, yet only three cases of infectious disease were received other than cases of stomatitis, which were admitted for other causes. Instead of 50% of admissions being due to traumatisms as is normal in garrison duty more than 80% of animal casualties on the Louisiana maneuvers were due to such causes. Thus the treatment of wounds assumed more relative importance during the 1941 maneuvers than is indicated by the Surgeon General's report for the preceding year.

There have been several epochs in the treatment of wounds. Not so long ago in the history of medicine, the hot iron was regarded as a valuable wound application. With the development of the science of bacteriology during the last quarter of the 19th century less irritant disinfectants achieved popularity. Milder and milder disinfectant solutions came to be used more and more frequently until during World War I, Alexis Carrel and others introduced the hypochlorite solutions which were scarcely irritant at all and were applied continuously for many hours. Soon after the close of hostilities in 1918 it began to be pointed out that frequent meddling with wounds delayed healing more than did the original infection, consequently a rigid technique of rest for the parts and non-interference with the process of wound healing acquired many zealous advocates.

Contaminated Wounds

Wm. M. Mitchell, M.B., M.R.C.V.S., in an excellent discussion of "War Wounds and Their Treatment" at a meeting of the Scottish Metropolitan Division, N.A.M.A.[1] summed up recent improvements in wound treatment as follows:

One of the great advances in human wound treatment which originated during the last war, was the realization that, if casualties could be got to an operating theatre while a wound was still merely a contaminated[2] one, it was often possible to convert a severe lacerated wound into a clean one free from infection which could be sutured up completely.

* From an address by Lieut. Col. D. M. Campbell, V.C., at the annual meeting of the Michigan Veterinary Medical Association June 22-24, 1942.

[1] *Vet. Rec.* 52:3, pp. 33-36.

[2] During the first 12 hours a wound is regarded as contaminated, after that period as infected.

Even when it was impossible to bring the surfaces of a wound together on account of loss of tissue, the same early excision of contaminated surfaces was done.

To this end casualty clearing stations, where operative surgery could be done, were established just outside the zone of actual battle, so that cases could be operated upon within a few hours after their occurrence, before infection had begun to spread. Under six hours the method gave the best results, beyond this period the results were proportionally poorer. After anesthesia, complete excision of exposed wound surfaces was carried out with as much care as would be bestowed on any major operation; the instruments used for the purpose being constantly discarded or resterilized. The ideal of complete eradication of all contaminated tissue cannot always be achieved, but it was recognized that the natural defenses of the body were often capable of overcoming a slight amount of infection without a sutured wound breaking down.

This explains how occasionally accidental wounds in animals sutured early without much regard for surgical cleanliness sometimes heal without suppuration, but such exceptions are generally a surprise. Under field conditions, most of us engaged in the last war realized that suturing of wounds of horses was a sheer waste of time, so did not do it. If, however, horses should again come to be used in the army in large numbers, and it is possible to organize a rapid evacuation within 12 hours to casualty clearing stations, these stations should be so equipped and staffed as to make it possible to apply modern surgical methods in the treatment of wounds.

Septic Infected Wounds

The ritual of daily dressing of septic wounds with antiseptic lotions is still the common method employed, largely because of the faith most people have in the power of antiseptics to destroy organisms in wounds.

In veterinary practice we still have some who believe in the efficiency of astringent wound lotions and the irritant antiseptics such as tincture of iodine, perchloride of mercury, etc., but most have followed the tendency which developed during the last war to use less irritant antiseptics such as hypochlorite solutions(eusol, Dakin's solution), bipp, one or other of the flavines, dettol, etc.

It is now beginning to be realized that the undoubted success of hypochlorites and bipp in the treatment of wounds lies not so much in their antiseptic powers as in their low toxicity, thus allowing the healing process to go on unhindered, and the diminished tendency to interfere with wounds once the method has been started.

A method of treatment which is now exciting great interest is known as the Winnett Orr method. Winnett Orr, an American army surgeon, was confronted at the end of the Great War with the problem of moving some of his cases of severe compound fractures to the United States before the fractures had healed. He simply packed the wounds with sterile vaseline gauze and buried the wound and the two adjoining joints in a plaster of Paris cast. It has taken another war, the recent Spanish War, to bring home the efficacy of the Winnett Orr method of treating wounds, though for a number of years the method has been well known in the treatment of chronic osteomyelitis.

Trueta, who was in charge of a hospital in Barcelona at the time of the air raids on that city, has recently published a small handbook[3] which will well repay study, as many of the details of wound treatment in human beings can be applied readily to wound treatment in animals. He applied the Winnett Orr treatment, with slight modifications, on a large scale, and the success of the method can be appreciated from the figures he gives of the results obtained in 1,073 cases of open fracture of the limbs: 976 gave good or satisfactory results, 91 were bad results, and only six died. These figures are all the more amazing when we study the description and illustrations of typical examples of the wounds treated, many of them with shattered joints as well as bones. Whereas formerly amputation was the chief hope of saving life by stemming the progress of infection, he shows that by the methods he adopted many patients are now able to expect a good functioning limb at the end of treatment. It should be understood that the methods of treatment Trueta adopted apply equally well to wounds with or without fractures of bones, though naturally those where bones were involved provided the more spectacular successes.

The method of immediate treatment of war fractures as carried out by Trueta is best given in his own words:

1. Adopt surgical treatment as soon after the occurrence of the fracture as possible. The type of anesthesia must depend on the situation of the wound and the condition of the patient; it may be, according to circumstances, general, regional or spinal.

2. Once the patient is anesthetized, thoroughly wash the entire extremity, and the wound with water, soap and a nail brush, until the whole is completely clean and the wound itself is bleeding; shave all hair. Paint the surrounding skin with a weak alcoholic

[3] *Treatment of War Wounds and Fractures; with special reference to the closed method as used in the War in Spain.* J. Trueta, M.D., pp. 143.

solution of iodine, without touching the wound in any circumstances.

3. Excise the skin edges of the wound, remove all contused tissue and widen the wound as much as may be required. Excise carefully and unhesitatingly all nonviable muscular and cellular tissues, noting in particular the color of the injured muscles, their contractility on stimulation with forceps and their capacity to bleed.

Open up the neighboring cellular space affected by the contusion and, where necessary, incise the soft tissues, following up the cellular spaces in the depths of the wound, always keeping in mind the need for adequate drainage. Remove any hematomas present.

5. Remove the majority of bone fragments that are completely denuded of periosteum or displaced, and all foreign bodies found at the site of fracture. There is no need to be concerned much about any pieces of bullet that are difficult to locate; but it is most important to excise carefully all foreign organic matter (pieces of clothing, wood, etc.). The procedures described above—namely, the removal of all foreign matter, the excision of all the tissues immediately surrounding the wound, including devitalized soft parts in the vicinity, and the opening up of cellular spaces—are known technically as débridement.

6. . . .

7. Once the fracture is reduced, dress the wound firmly with sterile gauze and immediately immobilize with plaster, including the two adjoining joints if possible.

8. Give an injection of tetanus antitoxin.

In some few cases where wounds were relatively uncontused and were excised within six or seven hours, he inserted a few interrupted sutures to allow of drainage between them (into the gauze) before enclosing the limb in a plaster of Paris cast. On no account should sutures be inserted if there is the slightest tension, or where there is doubt about the vitality of the tissues. The immobilization of the part by the closed plaster of Paris cast not only supports fractured ends of bones, but protects the injured soft tissues, especially the muscles, and thus prevents the spread of infection and absorption of toxins from wounds; in other words, it provides absolute rest of the part.

The closed plaster cast was also employed in the definitely septic infected wounds where the initial treatment had to be confined to the removal of foreign bodies and the provision of good drainage by enlarging the wound. The only exceptions not favorable to the application of plaster casts were cases where an acute cellulitis was already established or where there was a definite anerobic infection (gas gangrene).

These closed plaster casts were left on for long periods; premature removal, or even the making of a window, served to exacerbate local infections. Winnett Orr advises leaving the first cast on for as long as a month and the second for one or two months, but in Spain Trueta found the smell so intolerable to the patient that the first cast had to be removed after 10 to 15 days, though the second could be kept on from 20 to 30 days.

The only radical change Trueta made in Winnett Orr's method was that he employed sterile gauze instead of vaseline gauze, contending that the plain sterile gauze had a beneficial suction effect in the early stages.

The important lessons we learn from the Winnett Orr method of treating wounds are:

1. Antiseptics are not necessary to promote eradication of infection from wounds.

2. Infected wounds do best when allowed to "stew in their own juice."

3. The drainage of infected wounds to the surface must not be neglected.

4. The more completely a wound can be immobilized, the less risk there is of infection and toxins spreading by the blood and lymph streams.

Superficial Wounds

Fortunately there are many superficial wounds of everyday occurrence which do not require such drastic treatment as the Winnett Orr method envisages, yet if neglected or improperly treated they may be followed by serious incapacitating complications.

Superficial wounds, if seen early, can be dealt with by washing thoroughly with soap and water, using a sterile nail brush to get rid of contamination, and any shreds of devitalized tissue should be removed with scissors. Sutures can often be inserted and the wound protected by a sterile pad of gauze and a bandage.

In the clinical department of the Royal (Dick) Veterinary College surprisingly good results from this soap and water method of treating superficial accidental wounds have been obtained in dogs and cats when it has been possible to treat them within a few hours of an accident.

If a delay of more than 12 hours has occurred, beyond cleaning up the area around the wound, do not handle the wound roughly but merely apply a moist wet gauze dressing, which should be kept firmly in contact with the area by means of a covering of cotton wool and a bandage. This dressing promotes, by its suction effect, separation of the limited amount of necrotic and infected tissue, while the gentle pressure prevents excessive edema around the damaged area.

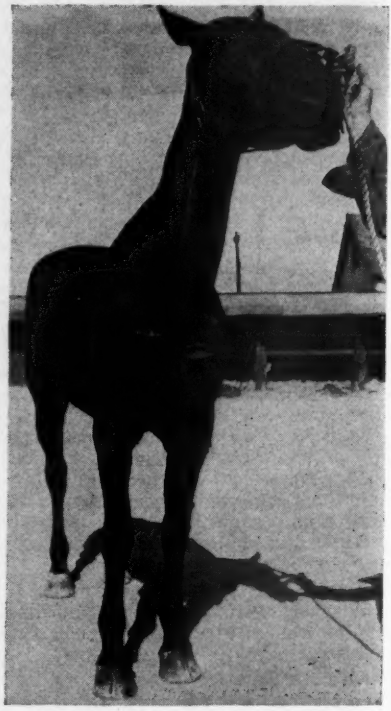
The moist wet dressing should be what its name implies—moist, not sopping wet—or its effect is harmful by promoting sodden granulation tissue. The material of choice as a wet dressing is gauze, four or five thicknesses at

least, wring out as dry as possible from 1-1,000 acriflavine or, occassionally when an area is edematous, out of a hypertonic saline solution, such as saturated magnesium sulphate or sodium chloride.

■ The treatment of wounds in animals has all along paralleled the trend in human medicine but in veterinary medicine the pendulum has not swung so far in either direction and the methods, on the whole, have been better, with one exception. When strong antiseptic applications were the vogue veterinarians used even stronger and more irritant applications than did physicians. This disadvantage, however, was likely more than offset in civil veterinary practice by less molestation of the wound, probably for economic reasons. Sometimes veterinary medicine has led the procession and human medicine trailed. About 30 years ago Merillat[4] and others began to advocate what was termed "uncarpeting" wounds—carefully trimming away the entire surface of contaminated wounds including all shreds and badly injured tissue. The results were good and the procedure was becoming established rapidly in equine practice when the slump came in that type of practice. "Uncarpeting" did not attain general adoption in the treatment of wounds of animals other than the horse. It was not till near the end of World War I that the medical profession adopted the method generally, renaming it débridement. Physicians refined the process, carried it further, obtained better results and adopted it more generally than veterinarians had done earlier.

■ Of the wounds occurring among the public animals on the army maneuvers in Louisiana during the summer of 1941 and evacuated to the 30th Veterinary General Hospital, injuries to the sole of the foot and of the withers and back were in the majority. Injuries due to kicks and from breaking through the floor of culverts and small bridges were fairly numerous and only less common were rope burns and jagged wounds from stakes, broken limbs on fallen trees, brush and down timber. Wire cuts, injuries from falling and many miscellaneous traumatisms occurred in small numbers.

Few of the wounded animals were admitted for treatment at the hospital until more than 12 hours had elapsed after the injury, so they belonged to the infected rather than the contaminated type and débridement was not regarded as indicated. Uniform treatment of all wounds was not practiced but a certain general routine was observed. The area about the wound was cleaned and shaved if haired. Foreign material was removed from the wound and, except for puncture wounds, the surface was washed thoroughly with soap and water. Shreds and other obviously devitalized tissue was trimmed away as were also ragged edges of skin or other tissues. After the open wounds were thoroughly cleaned and dried they were dusted with sulfanilamide and, if deep, protected for a couple of days by a gauze dressing moistened with a



Sometimes a wire fence was contacted during night maneuvers

[4] Merillat, L. A., 1915. Wound Treatment. *Vet. Med.*, Vol. X, 10:6, pp. 405-410.

saturated solution of magnesium sulphate. Further treatment did not include bandaging or protective packs, except in cases of rope burn.

Small deep wounds of soft tissue were explored carefully for foreign bodies and cleaned as well as possible with dry gauze. No liquids were injected into them, either to clean them or in the subsequent treatment. Where the drainage could be improved this was attained by enlarging the opening or providing an additional opening at the most dependent point.

In several of the puncture wounds resulting from kicks, joint capsules were opened. These open-joint cases included the elbow, knee and fetlock in the front limb; the stifle and hock in the leg. In such cases no attempt was made to explore the interior of the capsular ligament, only the surface wound was treated. When healed there was no impairment of function.

■ After the healing process in a wound was well started only mild desiccant powders were used on body wounds, chiefly as a protection against flies, and the same powder to which 5 to 20% of powdered alum was added was dusted onto wounds of the legs. Any removal of discharges that became necessary was accomplished by sponging with dry or only slightly moist absorbent cotton. Healthy parts onto which wounds drained were washed with soap and water as frequently as was necessary to keep them clean and render them unattractive to flies. There was little discharge except from deep wounds in the axilla and groin and those complicated by open joints.

In addition to the topical treatment of the wound all animals with grossly infected severe injuries and all with open joints were given sulfanilamide internally, one grain per pound of body weight divided into three doses and administered at eight-hour intervals.

It was not easy to evaluate the internal administration of sulfanilamide in most of these grossly infected wounds yet the promptness with which the profuse discharge of pus ceased in cases receiving it seemed to amply justify its use. But in the case of open joints there seems no question but that its use was beneficial. These cases usually came to the hospital with a profuse discharge of pus and synovia mixed, sometimes a great deal of pus and only a little clear synovia. The behavior of these open-joint cases was fairly uniform. In 48 hours after the internal administration of sulfanilamide was commenced the proportion of pus in the discharge was noticeably lessened; the swelling subsided; the animal suffered less pain and began to rest its foot on the ground. Within five or six days the discharge became clear synovia or synovia lightly flaked with pus. When this stage was reached the discharge decreased steadily in amount and in a few more days ceased and healing of the external opening then proceeded normally.

■ Only four cases of open joint treated in this way failed to recover. One, an open hock, was treated for two weeks by older methods before sulfanilamide was used. The wound healed and the soreness disappeared from the injured member but the deposit of fibrous tissue about the hock was so great as to interfere with the function of the joint at the trot. On this account the animal was destroyed as being unserviceable as a cavalry mount. Another case, an open elbow, which was under treatment only four or five days when maneuvers ceased and the hospital closed, was unable to stand shipment and for that reason was destroyed. However this case had not improved in the usual manner and the prognosis was doubtful. Lesions found on necropsy were probably irremedial. The third was a case of an open fetlock joint, which resulted from stepping through a hole in a plank floored culvert. After the case was treated two or three days the injury to the limb, aside from the open joint, was deemed beyond repair and the animal was destroyed. A fourth case, one of open hock, although it in no way differed in appearance from others that recovered, showed little improvement after being treated for three weeks and was destroyed as hopeless. Unfortunately circumstances precluded a necropsy in this case. No case of open joint developed laminitis, or gave down in the

opposite leg as has commonly occurred heretofore in such cases.

The foregoing plan of wound treatment was uniformly followed, with such modifications as circumstances dictated. Therefore, no controls can be cited to indicate whether it possesses advantages over older methods of treatment. However, the veterinary officers assigned to the hospital were unanimous in the opinion that most of the grave wounds healed with unusual promptness. Further, all had earlier observed fresh wounds treated by spraying with water an hour a day for three days, dressed with antiseptics and later with strong astringent applications. There was general agreement that healing was far tardier in such cases than in similar wounds treated with sulfanilamide on maneuvers.

■ Although the wounds treated in the manner described healed in a gratifying manner the treatment was not regarded as incapable of improvement and an effort was made to obtain sulfathiazole and urea with a view to compounding a dressing powder composed of 50 parts sulfanilamide, 25 parts sulfathiazole and 25 parts urea; but the latter two drugs were not obtainable. Theoretically the sulfathiazole should improve the dressing. On the same basis the urea should be advantageous in the deep wounds of the axilla and groin where surgical removal of devitalized tissue could not be complete. Considerable effort also was made to obtain ascorbic acid to give animals suffering from extensive injuries of the back and withers. But this too was unobtainable during the maneuvers.

Some veterinarians prefer solutions of sulfanilamide or suspensions in oil to the powder on the ground that the powder stimulates excessive granulation; others object to the powder because it cakes in the wound. The experience detailed in the foregoing did not support either of these views. Granulation in the wounds was regarded as normal, which is to say it did not require repression in body wounds but was inclined to be excessive in wounds of the limbs. An explanation possibly lies in the fact that the amount of the drug used was small except for the first dressing, and even that larger amount was dissolved completely by wound secretions. By applying sulfanilamide directly to the wound, it is possible to obtain a concentration of it in the wound secretions 100 times as high as that attainable in the blood stream by internal administration. The bacteriostatic action of wound exudates carrying this level of sulfanilamide is almost complete. After the first application the sulfanilamide was dusted on the wound only lightly and after the discharge from the wound ceased, it was not applied at all.

■ The utility of thoroughly washing wounds 12 to 48 hours old may be questioned. A thorough scrubbing with soap and water seemed justified by the condition of the open wounds which were almost always heavily soiled with hair, bits of wood, bark, grass, sometimes manure, and always dirt and sand. Further, it may be pointed out, that although this was a section and a season in which Habronema infestation of wounds was common, only three, of hundreds of wounds of army animals, developed Habronema infestations and these were very mild and easily overcome. Whether entitled to it or not the initial thorough cleansing was given much of the credit for preventing this troublesome complication of wounds in the subtropics.

■ Reporting on the use of sulfanilamide as a wound dressing in the military hospitals after the Pearl Harbor attack Col. John J. Moorehead declared: "The results were better than I had ever seen during 19 months in France when serving with the French, Belgian and American Formations."

In summarizing his report on the treatment of casualties following the Pearl Harbor attack Colonel Moorehead stated:

> Most of the fatalities were those suffering from internal abdominal wounds and those depleted by shock and hemorrhage. There were no deaths from gas gangrene and the discharge of pus from the wounds was almost absent, so much so that it became a subject of universal comment. There were no cases of tetanus, local or general, and the state of well being of the wounded was exceptional after the first few days.

This experience essentially duplicates that, related earlier, of the 30th Veterinary

General Hospital in the treatment of surgical wounds of the back and withers of animals during the Louisiana maneuvers. Since Pearl Harbor had to be, it is a matter of gratification that the opportunity to employ sulfanilamide extensively in the treatment of wounds came first to the Army Veterinary Service and its use there set a pattern for its life-saving employment by the Medical Service in the treatment of Army and Navy personnel at Pearl Harbor. Colonel Moorehead's statement that the "discharge of pus from the wounds was almost absent, so much so, that it became a subject of universal comment . . . and the state of well being of the wounded was exceptional after the first few days" describes exactly the oft-repeated comment of the veterinary officers on the treatment of wounds in the 30th Veterinary General Hospital by the local and general use of sulfanilamide.

Colonel Moorehead attributes the favorable outcome of the cases treated in the military hospitals in Honolulu on December 7th to:

1. Early receipt of the wounded—within the "golden period" of six hours.
2. Preliminary shock treatment.
3. Adequate débridement.
4. Use of the sulfonamide drugs in the wound and *per os*.
5. Adequate after care.

If I were to offer an opinion as to the measures contributing most to the results attained in the treatment of wounds of army animals on maneuvers I would say:

1. Thorough cleansing, including removal of all foreign matter and obviously devitalized tissue.

2. Local application of sulfanilamide and in grave or extensive wounds internal administration of the drug also.

3. Letting the wounds alone after the first treatment.

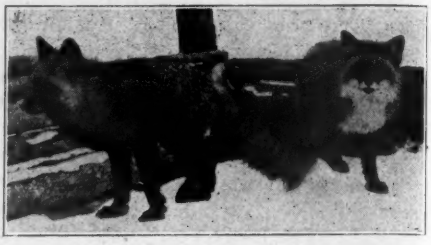
The value of thorough washing and complete removal of devitalized tissue is strikingly emphasized by saying that leaving such tissue in a wound is the exact equivalent of applying pieces of rotting meat to the wound surface. If any portion of muscle is discolored or has lost its contractility, or if any soft tissue will not bleed normally when nicked with the scalpel it requires immediate removal.

By No. 3 is meant that water and all manner of antiseptics, greases and oils were banned. When a crust formed on a wound it was not disturbed. Sulfanilamide was used as has already been stated until oozing from the wound surface ceased. After that any further applications were solely for protection against flies, not that flies would infect the wound, but to lessen movement of the tissues and to save the animals from annoyance. Where the panniculus carnosus is involved the movement of the tissues occasioned by flies is a serious deterrent of wound healing; not only because of interference with granulation but even more because it increases the lymphatic circulation —the principal route by which infection in a wound is extended. We cannot immobilize the wounds of animals to the extent that can be accomplished in man but all productive efforts to limit movement in the parts pay big dividends. In this connection good care and feeding should be mentioned. Nothing else contributes so much to the general comfort and feeling of well-being as thorough grooming and a full belly. All animals were groomed till their coats shone, good hay kept constantly before them and water given as often as they would drink. As a result they were quiet and the healing of their wounds greatly facilitated and thus expedited.

Common tendency to excessive granulation in large wounds of the limbs in horses is so well recognized as to make it scarcely necessary to mention that in such wounds the precept of non-molestation could not be carried out in its entirety. Such wounds usually required astringent applications during the latter half of the healing process.

Notwithstanding the traditional disfavor with which suturing wounds in horses is regarded, the degree to which the discharge from extensive wounds was suppressed by this thorough cleansing and dressing with sulfanilamide was a constant temptation to suture them. However the extreme pressure of the work during maneuvers seemed to preclude, or at least offered an excuse for not attempting to develop a technique for closing great, gaping, infected wounds.

Experimental Nicotinic Acid Deficiency in the Adult Silver Fox[1]



By A. Z. HODSON* and J. K. LOOSLI

THERE is a wide species variation in the requirement for nicotinic acid. Elvehjem (1941) states that the rat and the chick apparently do not need this factor performed while the dog and man are very sensitive to a lack of it in the diet. The present tendency in the feeding of ranch-bred silver foxes is to lower or eliminate the fresh meat portion of the diet and to replace it with meat by-products and cereals. Since niacin (nicotinic acid) is quite stable this replacement of fresh meat by meat by-products may not seriously lower the nicotinic acid content of the fox diet, providing the extractives are not discarded in the processing of the meat. The replacement of fresh meat by cereals and protein-rich oilmeals may, however, lower the content of the ration in this important vitamin. Although the general usefulness and economy of the newer type of ration has been shown, and its satisfactory use on fox ranches has indicated no serious nutritional deficiency, the question of whether foxes need the acid should be answered, since further replacement of meat and meat by-products by cereals will no doubt be made in an effort to develop more economical rations. Such an answer is also of interest in furthering the knowledge of comparative nutrition. Proof of the need for nicotinic acid in the diet of the fox and establishment of the symptoms of the deficiency may prevent such serious losses as occurred in the case of Chastek paralysis, a disease of foxes produced by feeding an unsatisfactory ration, as Green and Evans (1940) and Green, Carlson, and Evans (1941) have shown.

Plan of Procedure

Six adult male foxes and four castrated female foxes were used for the study. The foxes were kept in wire mesh cages in an unheated room and had access to water at all times. The diet used was a modification of one developed by Goldberger, *et al* (1930). The composition of the diet was as follows:

Yellow corn meal	72
Purified casein	18
Wesson oil	5
Cod liver oil (fortified)	2
Bone meal	2
Sodium chloride	1
	100

The major deficiency of the Goldberger diet is nicotinic acid. Evidence has been presented by Helmer and Fouts (1938), by Margolis, Margolis and Smith (1939), and by Waisman and Elvehjem (1940) that this diet may also be deficient in thiamin, riboflavin, pyridoxine and certain of the other factors required by the growing chick.

In the first trials to produce a nicotinic acid deficiency in the fox the unsupplemented diet given above was used, since it was believed that the major deficiency of the diet was of this vitamin and that sufficient proof of the need of the fox for it could be obtained by producing typical symptoms and then curing them by administering it. After consideration of the work cited above and the data for fox 976 (given below) it was decided to supplement the diet with 2mg each of thiamin chloride, riboflavin, pyridoxine and 4mg of calcium pantothenate per kilo of diet in the later work.

Experiment No. 1

Foxes, consisting of male animals 21, 18, 5, and 976 were fed the unsupplemented diet. After 20 days the mouth of fox 21 became

[1] A report from a cooperative project between the Bureau of Animal Industry, Department of Agriculture, the Fish and Wildlife Service of the Department of the Interior, and the Laboratory of Animal Nutrition, Cornell University, Ithaca, New York.

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very inflamed, and the animal showed little tendency to bite. The inflammation in the mouth, particularly in the cheek and around the teeth, became progressively worse and two days later there was drooling and the fur around the anus was wet. The animal collapsed a few hours later and was dead the next morning although 100mg of nicotinic acid had been given *per os*.

After 42 days fox 18 developed an inflamed mouth, and traces of blood were noted in the feces. On the 44th day 75mg of nicotinic acid were given *per os*. An improvement in the inflamed mouth was noted 24 hours later and it was normal after three days and began eating on the 4th day. After one week the original diet was supplemented with 2mg each of thiamin chloride and pyridoxine and 100mg of nicotinic acid per kilo of diet. The animal was fed the latter supplemented diet for 61 days without a recurrence of the inflamed mouth.

Fox 5 developed an inflamed mouth after 43 days. The feces were dark colored and gave a benzidene test for blood on the 49th day. On the 51st day 50mg of nicotinic acid were given and the next day the mouth was much improved and a test for blood in the feces was negative. There was no recurrence of the symptoms for a period of 30 days during which time the animal received the original diet plus nicotinic acid and for a period of 30 days during which the diet was supplemented with thiamin chloride, pyridoxine, calcium pantothenate and nicotinic acid as for fox 18.

After being fed the diet for 33 days fox 976 developed inflammation around the teeth. It was much the same until the 49th day when a nervous condition developed. The animal appeared to be dizzy and often fell over. The inflamed mouth responded to nicotinic acid administration but the nervous condition did not. Riboflavin was injected but there was no improvement, however a subcutaneous injection of 10mg of thiamin chloride produced a rapid cessation of the nervous symptoms. Whether the cure was brought about by the thiamin, by the delayed action of nicotinic acid or riboflavin or was a spontaneous one, cannot be definitely stated. The animal was fed the same diet plus nicotinic acid, but no thiamin or riboflavin, for a period of 29 days without any recurrence of the mouth or nervous symptoms, nor did they recur during the following period of 30 days when the fox was fed the diet supplemented with thiamin, pyridoxine, and calcium pantothenate as for fox 18.

Experiment No. 2

Male foxes A and B and castrate females 2E and 4E, were fed the unsupplemented diet at first but during the experimental period, a dose of thiamin, pyridoxine, riboflavin and calcium pantothenate was given and the diet was supplemented with these substances.

Male A and male B developed slight mouth symptoms on the 24th day. At that time the animals were given 5mg each of thiamin chloride, riboflavin and pyridoxine, and 10mg of calcium pantothenate, and the diet was supplemented with 2mg of the former three and 4mg of the latter substance. There was no improvement in the condition of the mouth and the test for blood in the feces remained positive but the appetites of the animals were slightly improved. Both animals collapsed and died on the 50th day. The inflammation in their mouths, while still marked, had receded somewhat and had been replaced by gray pus-filled areas. Gastrointestinal hemorrhages were noted in both cases.

Castrate female foxes 2E and 4E were given the same amount of thiamin chloride, riboflavin, pyridoxine and calcium pantothenate as males A and B and after the initial dose the diet was supplemented in the same manner, but this change was made on the 10th day before any symptoms of nicotinic acid deficiency occurred. Fox 2E developed mouth symptoms after 30 days. On the 36th day she collapsed and died in spite of the subcutaneous injection of 5mg of nicotinic acid. Evidently, after the animal's collapse, it was too late to reduce the symptoms by giving nicotinic acid. On necropsy gastrointestinal hemorrhages were noted, but there was no large amount of undecomposed blood in the tract. The mouth was inflamed. The test for blood in the feces of this fox was consistently positive from the 13th day, on which the first test was made, until death.

Fox 4E showed a negative test for blood in the feces on the 14th day but on the 15th day the test was positive. On the 27th day the mouth was inflamed and 2mg of nicotinic acid

were given. The next day it was nearly normal and the test for blood in the feces was negative and remained so for seven days. On the 36th day 2mg of the nicotinic acid were given. The test for blood in the feces remained positive and on the 51st day 50mg of nicotinic acid were given. No recurrence of either the mouth or feces symptoms were noted in the following 18 days during which weekly doses of 50mg of nicotinic acid were given.

In order to produce beautiful pelts, foxes must receive adequate vitamins in their diets

Experiment No. 3

Castrate female foxes 1 and 7, were placed on the diet low in nicotinic acid, supplemented with B_1, pyridoxine, riboflavin and calcium pantothenate. On the earliest day (the 9th) that a test for blood in the feces of fox 1 was made, the test was positive. This animal had an inflamed mouth on the 27th day and on the 32nd day 2mg of nicotinic acid were given *per os*. This small amount was not sufficient to cause the test for blood in the feces to become negative. On the 38th day 50mg of the vitamin were given. The next day the mouth was normal. No recurrence of the sore mouth occurred in 18 days during which weekly doses of 50mg nicotinic acid were given. This animal gave an occasional, questionable test for blood in the feces even after the first large dose was given.

Fox 7 developed an inflamed mouth on the 24th day. On the 32nd day 2mg of nicotinic acid were given *per os*. This was not a curative dose for on the 36th day the animal was near collapse and 20mg of the vitamin failed to revive her. The tests for blood in the feces of this fox were positive from the 9th day until death. The autopsy findings were the same as in the other cases, i.e. gastrointestinal hemorrhages and inflamed mouth with gray pus-filled areas, which extended on the tongue.

Weights were taken on six animals at the beginning of the experiment, when nicotinic acid was given, and after a cure had been brought about or at death if the fox did not survive. All the animals lost weight during the deficiency period. Two foxes, 976 and 5, which were fed the unsupplemented diet, continued to lose weight even after nicotinic acid was added. When the diet was also supplemented with thiamin, pyridoxine and calcium pantothenate, there was a marked gain in weight. Foxes 4E and 1, fed the diet supplemented with thiamin chloride, pyridoxine, riboflavin and calcium pantothenate, gained weight when nicotinic acid was given. The other two animals died from deficiency of the vitamin.

Discussion

The cessation of the deficiency symptoms by the administration of nicotinic acid is offered as the principal proof that the fox requires this vitamin. The fact that there have been no recurrence of these symptoms in foxes 18, 5 and 976, fed the deficient diet supplemented at first with nicotinic acid and later also with thiamin chloride, calcium pantothenate and pyridoxine, is additional evidence that the fox requires this vitamin since foxes A, B, 2E, 4E, 1 and 7 all developed the symptoms even when

the diet was supplemented with the other vitamins.

No single symptom of nicotinic acid deficiency which has been observed in the fox is sufficiently specific to positively identify the deficiency clinically. The test for blood in the feces, which appears to be a good symptom for experimental work is of little value in field work, not only because the presence of blood may indicate some other disorder, but also because the presence of meat in the diet may cause the test to become positive, although since meat is a relatively good source of the vitamin, the deficiency probably would not be suspected if a substantial proportion of the diet was composed of this foodstuff. The inflammation of the mouth, while probably more specific than the test for blood in the feces, is not a good symptom for clinical observation because the degree of inflammation varies from fox to fox. Probably the most specific test for nicotinic acid deficiency in the fox is the alleviation of the observed symptoms by the administration of nicotinic acid, although in the more advanced cases this also fails.

In experimental work on a meat-free diet, the Wagner benzidene test for blood in the feces (Hawk and Bergeim, 1931) gives the first indication of nicotinic acid deficiency in the fox. The observations reported above were not begun early enough to establish when this symptom first dedeveloped, but in every case in which early observations were made the test was positive several days before any mouth symptoms were noted. The marked gastrointestinal hemorrhage noted at autopsy gives evidence that the positive reaction is caused by blood rather than some interfering substance.

The experimental work reported above gives no evidence of the minimum curative dose of nicotinic acid for the fox. In one case 2mg (0.66mg per kilo body weight) produced a temporary alleviation of the symptoms. In two cases this dose was ineffective. The dose of 50mg (12.7-16.6mg per kilo body weight) which proved effective is probably well above the minimum curative dose.

Summary

1. Nicotinic acid deficiency was produced experimentally in 10 adult silver foxes.
2. The symptoms of the deficiency are inflamed and pus-filled areas in the cheek and around the teeth—more rarely on the tongue, refusal of food, gastrointestinal hemorrhage and finally a collapse condition in which the animal has become completely relaxed and at least partially unconscious.
3. Five animals, which received oral administration of nicotinic acid before the collapse stage of the deficiency was reached, recovered completely.
4. Five animals, which reached the collapse stage, even though nicotinic acid was given to three of them, died.
5. Other than the collapse of the animal, there is no clear line of demarcation between the mild and severe deficiency as the degree of mouth inflammation varies from animal to animal and often recedes slightly in the collapse stage.

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The Fox Fur Industry

According to the 1940 census there were 2,655 silver fox farms in the United States. In April of that year there were 103,301 females over three months old and 261,000 silver foxes had been pelted that season.

As a producer of silver fox pelts Wisconsin was far in the lead with 493 farms and 101,439 pelts. Michigan, with 302 farms and 34,332 pelts was second; Colorado (139 and 16,929) was third and Minnesota (189 and 14,655) fourth. Altogether pelts were produced in 35 states.

Autobiography of a Veterinary Practitioner

By E. T. BAKER, Moscow, Idaho

IX. My Second Job

WHEN I left Washington State College to come to the University of Idaho, I found conditions very unsatisfactory at the latter place. These were due to a number of things. As I look back, I realize that it is rather hard to mix oil and water.

In the first place, there was no division of veterinary science, but merely a one-man department, under the general orders of a dean of the college, who was an animal husbandry man. There is a wide diversion of opinion between the two professions, and the average animal husbandman regards the veterinarian as a necessary nuisance. I am glad to have had this experience, for it gave me an insight into another line of work. When I hear a professor of veterinary science admonishing his students to take a broad and altruistic viewpoint of their profession, and to lie awake at nights thinking how they may benefit the livestock industry, it causes a large smile to creep over my not too handsome countenance. I have found, after making a good many professional calls, the only time a stock owner is interested in my welfare is when he thinks I can save a hundred dollar animal for five or six dollars, and allow the bill to run several years at that.

The second drawback was that the veterinarian was expected not only to teach the agricultural students trick courses in veterinary science, but also to attend to the farm animals. As the barns were over half a mile distant, and we had no cars in those days, I was often called to an emergency case in the middle of a class. "Hot-footing" it through the mud and snow in a good suit of clothes was often expensive, although I had older clothes hanging up in the barns. Many night and Sunday calls came in, so that I had a seven-day-a-week job, and never felt free.

The third disadvantage was that a fierce political fight was being waged between the northern and the southern parts of the state in regard to the location of the university. The southern interests in particular wanted the college of agriculture moved to the middle or southern part of the state;

E. E. Wegner, the present dean of Washington State College, where the author taught several years ago

and every time the legislature met, which was every other winter, a free-for-all fight ensued. Many of the professors were afraid

to buy property on this account, and things were kept in a continual uproar.

The last and final straw that broke the camel's back was the financial economies put through the legislature in an attempt to cripple the university. During my last year at the school a number of departments had to be amalgamated to save money, and, among others, my department was merged with the animal husbandry division, and I was made an associate professor. My collegiate standing, therefore, was about the same as that of a straw boss in a sausage factory. As I was used to being treated as an equal in the college of veterinary science, the change was quite distasteful.

Soon after I started teaching, I was sent down to southern Idaho on a six weeks' extension tour. Making arrangements with a local veterinarian to look after the farm animals, I traversed every county in that part of Idaho, and found an entirely different set-up from that in Washington. Irrigation was practiced extensively. Nearly all the inhabitants were Mormons, whom I found to be very fine people. I was greatly impressed with the enormous distances in this state. It is over a thousand miles from north to south, or as far as from New York to Chicago. Even today, to go to our state capital, Boise, by rail, we have to go through two other states, and the distance is 520 miles.

In addition to being a scenic state, Idaho is an extremely productive one. The south part of the state is irrigated with water from the Snake river

Idaho is a very scenic state, and is noted for its sheep, sugar beets, big potatoes and fruit. It raises enormous amounts of alfalfa, and the dairy and poultry industries have become quite extensive. It is comprised of two distinct divisions—the north, which is non-irrigated, and the irrigated south, which derives its water largely from the Snake river, much as Egypt depends on the Nile.

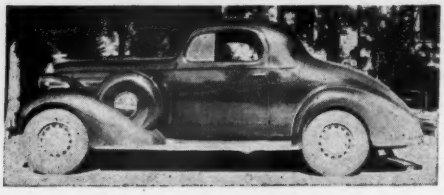
After two years with the university, I began to grow restless. I have mentioned the reasons in detail to show why a veterinarian should not be compelled to take orders from another department, or *vice versa*. They just do not mix. My experience, however, was to prove of great value in future years, for I got to see every county in Idaho and become acquainted with their livestock problems. There is a wonderful opportunity for various state institutions to help their tax payers, but in most cases there is a lot of running around by college professors who are wondering how long their jobs are going to continue. This feeling is not conducive to much intensive research work.

A position was open in an adjoining state college, and I made a trip to look it over, and was to give my answer by August 1st, 1913. However, an affirmative answer was never sent, because of a peculiar event that happened just about that time.

In July of that year, just after my return from this investigating trip, the local practitioner, who had practiced here for nearly 25 years and had accumulated a couple of good ranches, wanted to retire. He offered me his practice for nothing flat, and said he would throw in all his instruments and supplies if I would answer any calls to his farm. He said that if this were done, his neighbors would not expect him to answer their emergency calls. He added he was

doing this because I had not chiseled into his practice while with the university, and he appreciated it.

While I was debating on what to do, an outbreak of equine influenza occurred about 20 miles to the south, and, being the nearest veterinarian, I was called in. Using serums and bacterins, and a successful oral treatment I had picked up from a city practitioner, I had excellent results. By working early and late, even without a car, I cleared over $800 in three weeks—I have never been on a straight salary since. I found that



In 1914 I bought an automobile. Since then I have had six of the same make

practice gave me scope to express my rugged individualism, and to be my own boss.

As stated before, it was in 1913, that I had a good practice handed to me. The next few years were to see some striking changes in that and every other veterinary practice. There was much talk of horseless wagons and trucks, which few took seriously. Harness makers and livery stable owners laughed in derision. In March, 1914, I bought my first auto—a little red Buick coupé. I have had six of this make in the last 25 years.

Also, another movement began about the time the auto came in. That was the passing of the quack. He was usually a combination of horse trader, card shark and pool room expert. He could not adapt himself to "doctoring" cows, hogs, sheep or small animals. After he was called by some old client to replace an eversion of the uterus in a cow, he quit in disgust, and drifted into other lines of work.

Now, we are not implying the horse is obsolete, for it is not, and probably will remain as long as land is farmed. However, thirty years ago it made around 75% of the average practice, whereas now it may run as low as 25%. Personally, I do not regret this change. Equine practice is the most difficult of all veterinary work. Horses re-

Equine practice is the most difficult of veterinary work. In 30 years I have treated 5000 cases of digestive troubles—mostly impactions

quire more supplies than any other animal and often fail to respond to the most painstaking and laborious treatment. I have stayed up many a night with a sick horse. One hardly ever is compelled to stay more than an hour or so with any other animal. Often, after a horse seems well on the road to recovery, he takes a notion to die from some complication, and all our efforts have been in vain.

In 30 years, I have treated probably 5000 cases of digestive troubles in horses, mostly impaction, due to wheat hay and straw, and I speak from a pretty wide experience. My idea of heaven is a milk fever case, owned by a cash customer, every morning after breakfast, and no equine impactions or canine distemper.

Another thing that made equine practice so difficult in former years was the lack of good roads. In muddy or snowy weather it was impossible to get to the patient in time to do much good. Twenty-five years ago I would start out in the early morning with a livery team and buggy, and not get home until late that evening. Perhaps I had made two or three calls, and had covered nearly all of 20 miles. Now, I can do that in less than an hour.

(To be continued)

★ ★ ★ BUY WAR SAVINGS STAMPS AND BONDS

Cobalt Deficiency in Dairy Cows

A disease of dairy cattle colloquially known as Grand Traverse or lake shore disease has been recognized in Michigan for many years. An early account of this condition was published in 1909.

Nearly every year since that time it has been the common experience of many dairymen during the winter and early spring months that many cows refused to eat very good alfalfa hay or cereal grain, became emaciated and in some cases died. If the cows were able to survive the general emaciation, the condition was usually alleviated when the animals had access to succulent spring pasture. This situation was greatly emphasized during the past winter. Numerous instances have been reported where cattle became unthrifty, developed morbid appetites, attained extreme emaciation and finally refused to eat. Cows dropped calves in an apparently normal manner but the calved dwindled and died in from two to six weeks. After calving the condition of the cows declined very rapidly. All of these things occurred despite good feed and good feeding methods. The feed was supplemented by salt and bone meal, and in some cases molasses was added as a safeguard against ketosis.

Similar conditions of emaciation in cattle and sheep variously known as "salt sick" in Florida, "neck ail" in Massachusetts, "pine" in Scotland, "bush sickness" in New Zealand, "coast disease" in South Australia, and "nakuritis" in Kenya Colony, have been reported. All of these conditions have responded to iron or iron and copper, and in some instances, to cobalt therapy.

During the stall-feeding period of 1940-41, an unusually large number of cows and calves were affected. The symptoms of the disease were well defined and consisted of progressive debility, anorexia, a marked decrease or cessation of milk flow, depraved appetite, and general emaciation. The hair had a rough, hard, dry appearance, and the animals did not shed hair until late in the season. The visible membranes were pale. Many animals not showing acute symptoms appeared to lack thrift. Calves also were subject to this disease and they often succumbed at an early age. Growth was retarded markedly and the calves presented a stunted and unthrifty condition. The skin became scaly and dry and the animals developed a depraved appetite for hair. General ill health became manifest as emaciation progressed. Many of the cows and some calves showed a marked tendency to eat swamp grass, straw, bedding and to gnaw vigorously trees, fence posts and stanchion ties. The disease seemed to be prevalent in cattle of all ages, and in both sexes.

The obvious resemblance clinically to phosphorus deficiency and also to extreme ketosis prompted us to carry out estimations of plasma inorganic phosphorus and to examine the urine for the presence of ketone bodies. The results of the biochemical data definitely eliminated these two diseases. The hemoglobin value of the severely affected cows suggested the similarity of this condition to that in sheep as reported by the Australian and New Zealand workers in which it was found that one milligram of cobalt per day brought about a remarkable improvement in the condition of the sheep.

It was decided to set up a field experiment on adjoining farms on which herds were severely emaciated. One herd received 13 milligrams of cobalt per day per cow in addition to the regular home-grown feed, while the adjoining herd served as the con-

trol. Within 3 to 10 days following the administration of the cobalt supplement, all of the treated cows showed a spectacular improvement in appetite, milk production and general appearance, while the adjoining herd became progressively worse. These developments occurred in cows which had been afflicted for several months and were in most instances refusing to eat or just nibbling at good feed. Later the control herd received the cobalt supplement with the same phenomenal recovery. In addition to the above-mentioned herds, eight other herds have received a cobalt supplement (as the sulphate or chloride) during the past stall-feeding season, with the same results. In some instances the herd was divided and part of the animals were used as controls but usually this was not satisfactory because the herd owner soon observed the results in the treated groups and saw no reason for depriving the other cows of the benefit of the treatment. It should be emphasized, however, that the only change in the routine feeding practice in all of the farm herds was the addition of the cobalt supplement. With this treatment the same home-grown feeds which produced the deficiency disease, were adequate to support normal nutrition and gradually to restore milk flow to its maximum capacity.

Hemoglobin and plasma inorganic phosphorus determinations were made in conjunction with the cobalt feeding trials at irregular intervals. The hemoglobin values of the severely emaciated cows were found to vary between 6 and 8 grams per 100ml, whereas the hemoglobin values of the mildly affected cows varied from 8 to 10 grams. In nearly all cases the hemoglobin values decreased 10 to 20% following the administration of cobalt before the values turned upward. Hemoglobin regeneration was not so responsive to cobalt supplementation as was desired, but the general response of the cows in appetite, appearance and increasing milk production was very satisfactory. Preliminary results from hay samples obtained from affected farms shows that they contained from one-third to one-half as much cobalt as did samples from unaffected farms.—*Mich. Agr. Exp. Sta. Bul.* 24:1.

Intelligent Disease Control Must Derive from Veterinary Vital Statistics

A fundamental failure of our veterinary service is recorded in the fact that we have not, up until this day, taken any pains to accumulate animal morbidity and mortality statistics. As a result of this, except as to tuberculosis and in very recent years bovine brucellosis, we have but the sketchiest information concerning the prevalence of any of the diseases of livestock, of the amount or even the proportionate loss from any of them. We know certainly that the toll of disease of domestic animals in this country is enormous; but any figures, official or otherwise, are but guesses, with very little basis on which to guess.

* * * *

Feed the Soil to Feed the Plant to Feed the Animal

Henry Jeffers and associates at Walker-Gordon farms, Plainsboro, N. J., saw the importance of vitamin D in milk many years ago. They found that when cows were fed irradiated yeast the vitamin D contained in it enriched the milk produced. Many babies owe their straighter legs to this discovery. These men reported that milk gives better results in the feeding of babies if the cows receive feed rich in vitamin content. By a process of machine drying of fresh alfalfa and other forage plants their vitamin content is preserved; chemical tests show that hay thus prepared contains from two to ten times as much carotene as that ordinarily used.

The aim of agriculture in the past has been at maximum yields per acre or at the size and appearance of a product. The aim in the future must be at high nutritional values. Methods and time of harvesting as well as type of storage affect the nutritive value of these hays. . . . Nature is not too reliable and normal foods are not always what they should be. The soil in some regions is poor and the products of such soil fail to contain some nutrients which one would expect to find in them. The forage is improved when such soils are enriched.—*Russel M. Wilder, Chn. Com. on Foods and Nut. Nat'l Res. Coun.*

Insufflation Therapy in Vaginal Infections

By E. G. BAXTER
Webster, New York

THE widespread use of insufflation therapy in human trichomoniasis prompted a series of field trials on herds of cows infected with *Trichomonas vaginalis*, agranular or vesicular vaginitis. In view of the fact that a special veterinary insufflation powder should contain a silver antiseptic, preferably of the complex salt class in addition to a phenol derivative of high germicidal power, a commercial veterinary insufflation powder "povage"* was chosen. It contains a highly adsorbent base of osmotically purified aluminum silicate combined with a water-soluble complex salt of silver chloride with thio-urea and chlor-hydroxy-diphenyl. The silver salt has been shown to act as a specific against trichomonads *in vitro* and the chlor-hydroxy-diphenyl was found to have a phenol coefficient of 105 against staphylococcus aureus.

The adsorbent ratio for methylene blue of the aluminum silicate (so-called osmo-kaolin) is about 350% as compared with ordinary medicinal kaolin.

The theory, as advanced by the clinicians using insufflation therapy in human medicine, is that the adsorbent causes a concentration of organisms due to surface tension and that the silver salt then has a chance to kill the trichomonads. Since the additional presence of a phenol derivative antiseptic could be beneficial only for the conditions encountered in vaginitis of cows, povage was used in all cases.

It was found that the "powder cartridges" and an "insufflator gun" as used by the physician were not only too expensive for veterinary use, but valueless for cattle practice. After several trials an effective and inexpensive insufflator bulb was developed (Fig. 1).

This double tube arrangement prevents closing of the outlet by moistened powder upon aspiration of the bulb.

The outlet tube from the bulb is kept about one inch inside of the protecting tube and the whole inserted into the vagina up to the os. While dusting, the tubes are gradually withdrawn so that the walls of the vagina and the vulva are uniformly covered with the powder. The following case reports from a herd of pure bred Holsteins is typical of my experience with it.

Cow No. 1—On account of the discharge from the uterus the vagina was washed twice daily with one quart of normal saline solution. After

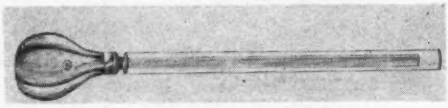


Fig. 1. Double tube insufflator

complete drainage, povage was dusted on the cervix and walls of the vagina. The uterus returned to normal and no trichomonads were found after three weeks treatment, nor two months later when the animal was bred successfully.

Cows No. 2 and No. 3—The uterine conditions seemed normal and firm, but small amounts of pus were formed around the walls of the utera in which trichomonads were found. Treatment was a daily washing with the saline solution and insufflation with povage for one week; after which the powder alone was used once a day in ½ ounce doses. No trichomonads were found after three weeks to two months.

A herd of pure bred Brown Swiss cows with eight showing granular vaginitis and some vulvular involvement. All cases were dusted with povage morning and night for a week. In those showing vulvular inflammation, the raw parts were covered with argenitis ointment (a bland antiseptic silver preparation). Three of them required treatment with povage alone for the second week at which time all appeared normal.

A herd of pure bred Holsteins had been treated for vesicular vaginitis by means of liquid antiseptics (including oxidizing solutions) for over two months. In comparison the results from povage treatments were remarkable. Four cases showed marked improvement in one week and in three weeks all except one of the animals were normal. The argenitis ointment was used where there was much vulvular inflammation.

The above mentioned cases clearly demonstrate the superiority of an antiseptic highly-adsorbent powder over simple oxi-

*The povage powder used was supplied by the R. J. Strasenburgh Co.

dizing solutions such as potassium permanganate. The insufflation method is more convenient and lends itself well to the preparatory treatment of cows or mares for artificial insemination. It is important to point out that these herds had been treated previously with the usual antiseptic or oxidizing solutions but had not recovered.

There is little doubt that insufflation treatment of vaginitis, in its various forms, is a decided step forward in veterinary therapy since caretakers can handle the cases easier and more completely with much less work.

What People Think of Us

Having spent the past six weeks in a Veterans' Hospital, and having come in contact with men from all over a certain part of our country, I thought their comments on our profession might be interesting. It shows how our clients regard us, and why we should always try to be a credit to our calling instead of, by our actions, bringing it into disrepute.

My first conversation was with a nurse. I asked her:

"Do you know Dr. Blank?" mentioning the veterinarian in her home town.

"Sure, I know him. He is certainly a gentleman and a good doctor. His town is better off because he lives there." It made me feel proud of my profession, but not for long.

My second query was to a patient next to me: "Are you acquainted with Dr. So-and-So?"

"Yes; I took my dog to him for a vaccination, and he jabbed the needle in her udder. I had to take her back two or three times for him to open the abscess, and finally paid him $1.50 to kill her. We have another veterinary there now."

Making my third query: "Do you know Dr. Home Town?"

"Sure; he's a good doctor, and everybody likes him, but he keeps such a dirty place, and is not any too clean himself. You can even smell his automobile, which is a ringer for his office."

Engaging in conservation with my fourth person, I asked him about the veterinarian in his home village.

"Yep; Doc is a good man, but he's his own worst enemy. He drinks too much. You can't get him when you want him. Too much liquor."

As I turned somewhat disheartened to my

"I like Doc because he's interested in my dog"

next companion, he replied with a smile:

"Sure; I've known Doc for a long time. I like him because he's interested in your dog. I lost a pup in his hospital, and he helped me get another one. She's a Boston, and marked pretty as you ever saw; got a pedigree long as your arm; just a minute—" Then, he went to his locker and pulled out a paper, sure enough, he even has the papers there in the hospital with him. You know that man loves his dog and he has a high regard for his veterinarian.

Feeling much better, I asked my sixth quiz victim: "Do you know Doctor (home town again)?"

"Yes, and if you ask me, he's not much of a doctor. I took my dog to him; she was shaking her head, and holding it to one side. The doctor just looked at her and said there was not much the matter with her. He did not even give me any medicine.

I said: "Why not take her back?" and he answered: "No; we got some medicine from the drug store and are giving it now."

Then I came to my lucky seventh person. Surely, he would make me feel much better, but his answer was:

"Yes, I know Doc, and he seems like a good scout, but he don't care whether he goes to your place or not. He's good on horses and cows, but he don't care a whoop for other animals."

There, you have a cross-section of what people think of us.

B. M. WESTON

Mt. Alto, Washington, D. C.

Sterility Case Reports

By E. E. CHAMBERS, Trion, Ga.

WHILE the modern texts are priceless in this type of veterinary practice, I have found that by looking over the herd book and reviewing treatments I am helped in countless ways. If one is called to treat sterility in a herd for which a herd book is not kept he cannot help himself or the owner more than by instituting one right away and insisting that the breeding history be fully and accurately recorded in it. This paper is written with the hope that those who read it will be impressed with the necessity of such records. The following actual notations on 12 cases taken from one herd book illustrates forcibly the advantage of having such information when undertaking the treatment of a condition as complex as sterility.

Case No. 1.—Born 8-5-39. Bred twice and found pregnant to the 2-19-41 service. In heat and bred 4-26-41. In heat and not bred 6-8-41. Examined 6-17-41 and both ovarian ligaments were found to be thickened with adhesions on both sides. Small CLL (corpus luteum left ovary) and vaginitis; silver picrate was dusted in the vagina twice a week and one heat passed. CLL expressed 7-31-41 and bred 8-17-41. O.K'd pregnant 12-18-41 to the 8-17-41 service.

Case No. 2.—Born 6-2-40. Past age to breed and had never been in heat. CLR (corpus luteum right ovary) expressed 12-26-41. Bred 1-5-42 and 1-28-42. O.K'd pregnant 4-1-42 to the 1-28-42 service.

Case No. 3.—Born 1-21-40. Bred six times and returned to heat each time. Was examined 12-5-42 and diagnosed as bilateral ovarian adhesions. Reëxamined 12-18-41 and diagnosed as bilateral ovarian and tubal adhesions. Unfavorable prognosis was given as to breeding. All periods of estrus are from 19 to 21 days. She has been bred 13 times and is still not pregnant.

Case No. 4.—Born 8-20-40. Virgin heifer past date to be bred and had never been in heat. 1-20-42 CLR partially expressed, in heat and bred 1-27-42 and 3-8-42. 5-11-42 O.K'd pregnant to 3-8-42 service.

Case No. 5.—Born 7-28-39. Bred 12-30-41 and O.K'd pregnant 3-26-41. In heat 5-8-41 and not bred for two periods. Adhesions on right ovary, 6-17-41 and a few granular lesions in the vagina. Vagina was dusted with silver picrate twice a week. Bred 7-12-41. An imperforated hymen was removed. In heat and bred 8-22-41, O.K's pregnant to service, 12-18-41.

Case No. 6.—Born 7-14-41. Virgin heifer and past date to be bred and had never been in heat. CLR expressed 1-20-42. In heat and bred 1-31-42 and 2-22-42. O.K'd pregnant 4-1-42 to 2-22-42 service.

Case No. 7.—Born 3-7-40. Virgin heifer, in heat three times. Bred during her fourth period of heat, 9-7-41. O.K'd pregnant 12-1-41 to 9-7-41 service. No cervical seal 12-18-41, corpus luteum in process of absorbing, right horn about the size for a 60-day pregnancy. Uterus contracted normally 1-20-42. CLL partially expressed. Bred 1-23-42, and O.K'd pregnant to that service 4-1-42.

Case No. 8.—Born 2-9-39. In heat twice and bred third period, 7-16-40. O.K'd pregnant to that service 12-12-40. Mummified fetus diagnosed 3-26-41, and CLL expressed. Aborted mummy 3-29-41. In heat 5-9-41 and bred same date. O.K'd pregnant 7-31-41 to 5-29-41 service.

Case No. 9.—Born 7-5-39. Bred 12-19-40 at second heat period. O.K'd pregnant 3-26-41. Aborted mummy fetus 5-14-41. Non-functional ovaries diagnosed 6-17-41. Ovaries massaged twice a week and one heat period skipped. Bred 9-14-41 and 10-5-41. O.K'd pregnant 12-18-41 to the 10-5-41 service.

Case No. 10.—Born 7-29-40. Had been in heat and bred 1-9-42. This was never posted in herd book and she was examined 1-29-42 to find out why no heat periods were seen. CLL expressed at this time and examination revealed no indications of pregnancy. In heat and bred 1-31-42. O.K'd pregnant 4-1-42 to 1-31-42 service .

Case No. 11.—Born 6-23-40. Past date to be bred and had never been in heat. CLR expressed 1-20-42. Ovaries massaged 1-27-42. In heat and bred 1-31-42. Half-inch cyst on left ovary and three half-inch cysts on right ovary diagnosed 4-1-42. These were ruptured and ovaries massaged twice a week. In heat and bred 4-23-42.

Case No. 12.—Born 6-5-40. Past date to be bred and had not been in heat since 9-4-41. CLL expressed and ovaries massaged 12-26-41. In heat and bred 1-3-42. Had been bred three times and one heat period passed up. Examined 4-1-42; ovarian ligaments thickened, some vaginitis. Silver picrate was dusted in vagina twice a week and she was in heat and bred 5-10-42.

★ ★ ★ BUY WAR SAVINGS STAMPS AND BONDS

The cow in the foreground, owned by George S. Schrodt, Canton, Ill., gave birth to the twin calves pictured, at a week's interval. J. D. Cluts, of the same city, officiated at the parturitions which occurred on June 3rd and June 10th, respectively

Recurrent Urinary Calculus in a Steer

A yearling Hereford steer, in good condition and weighing about 600 pounds was presented at the veterinary clinic of Kansas State College early in January, 1942. The animal had been sick, off feed and straining since the day previous. The owner thought the trouble was impaction.

On examination, the pulse and temperature were found to be normal, but respirations were somewhat labored. The mucous membranes were of a normal pink color. Nothing abnormal could be detected in the digestive tract on palpation through the rectum. The bladder was found to be distended more than normal with urine, causing severe pain and stranguria. No other abnormalities were present. A diagnosis of retention of urine due to urethral calculus was made. An operation was indicated.

The animal was restrained and operated upon in standing position. The bladder was tapped and partially drained by inserting a 16-gauge, 6-inch needle through the abdominal wall about an inch lateral to the median line, anterior to the scrotum. The operative area, located in the perineal region just above the base of the scrotum, was shaved and disinfected thoroughly with a 1 to 1000 alcoholic solution of bichloride of mercury. The tissue in this area was infiltrated with 20cc of a 1% solution of procaine. An incision about four inches long was made in the median line over the penis and the urethra, about ten inches below the anus. This incision was continued through subcutaneous tissue by blunt dissection until the penis was freed of other tissue in that region. The penis was retracted through the incision, the dorsal artery separated from the penis, a mattress suture of twisted silk put through the penis and skin, and the penis amputated distal to the suture. Interrupted sutures were used to close the skin incision. As urination occurred readily following cutting of the urethra, the patient was discharged. Slaughter was advised as the condition seemed likely to recur.

Three weeks later the patient was again presented at the hospital. The animal had been straining to urinate for about 24 hours but without success.

The patient's symptoms were similar to those first noticed. The bladder was greatly distended with urine. Tiny, calcareous particles were noticeable on the end of the penis and just inside the urethra. An attempt was made, without success, to pass a male canine urinary catheter. It could not be inserted into the urethra more than two inches until it struck something which could not be passed or dislodged. A distinct grating sensation on the catheter caused by calculi was evident. Surgical means was the only alternative.

The operative area, in this instance just below the anus exactly over the point where the urethra turns down over the ischium, was shaved, disinfected and anesthetized locally as before. An incision, about three inches long was made through the skin and subcutaneous fascia deep enough to locate the urethra on the ischium. The urethra was then separated by blunt dissection and a three-inch incision made in it so that a catheter could be passed into the bladder to facilitate drainage of the retained urine. The edges of the incised urethra were then sutured to the skin, thus creating a permanent urinary fistula. The animal was discharged.

Slaughter was again advised. In a few days the animal was shipped to market and sold subject to inspection. At that time no offensive odors or pathological conditions could be detected and the carcass passed inspection.

ROBERT E. HAUKE

Newton, Kans.

Fracture in a Mule Successfully Treated

Recently I was called to see a valuable young mule. Examination revealed complete fracture of the humerus. A local blacksmith made a splint for me. It was fashioned

somewhat after the appliance described by N. A. Kippen in the September, 1940 issue of VETERINARY MEDICINE, page 493, except that the ring part was made of five-eighth inch and the straight parts of three-eighth inch steel rods.

The ring was well padded with cotton and bandage; the mule cast; the fracture reduced, and the splint applied and leg held in place by adhesive tape. After 18 days the animal was again cast and the splint removed. It rose and walked away with but a slight limp which disappeared in a few weeks. Recovery was complete.

M. L. DIETRICH

Newton, Kans.

* * * *

A modified Thomas splint (at right) designed by the late Doctor Kippen for solipeds having fractures, severed tendons or serious foot injuries. A tripod (adjustable to the length of the fore or hind leg) supports a strong metal ring and is based upon a horseshoe. The shoe (No. 5) is bisected and hinged at the front. Flanges extend above the shoe by which it can be clamped securely to the hoof

Live Stock Producers Condemn Community Auctions

Of 420 letters received by a Kansas City livestock firm in reply to a questionnaire, only 13 approved community auction sales, 71 expressed a mixed opinion and 264 condemned them. They told of livestock trucked from one sale to another and sometimes to half a dozen sales by speculators; of animals filled and refilled, starved and abused in transit, hauled in dirty, insanitary trucks, sold through insanitary pens, of misrepresentation at the sale, of by-bidding and other abuses.—*Harry O'Brien.*

Unhappily some farmers look upon community sales as a place to rid themselves of sick animals or of animals which have been exposed to disease and it is feared will become ill. Others will not practice such chicanery on their neighbors but sell these animals to the livestock peddler—the speculator—and let him take them to the auction and take the responsibility in case disease is transmitted to neighboring herds.

Sulfapyridine Therapy in Calf Diphtheria

Calf diphtheria, according to Hutyra Marek,[1] is a disease affecting young to half-grown calves. It is a diphtheroid necrosis of the buccal and pharyngeal mucosa caused by the *Actinomyces necrophorus* organism. It is usually fatal as the result of the development of pneumonia or a general septic infection.

Although calf diphtheria has been attributed to this particular organism, Farquharson[2] believes there is reason to view it with considerable skepticism. True it is that *A. necrophorus* is found in the lesions but other organisms also are there in abundance. The question arises: Is the necrophorus fungus the primary etiological agent or is it the principle secondary invader? The etiology of calf diphtheria is no more clearly understood than that of several other necrophorus infections and this whole field is controversial among bacteriologists.

Calf diphtheria begins with an inflammation, reddening and swelling where the *A. necrophorus* penetrates the mucous membrane of the pharynx or larynx. Later the area becomes necrotic and appears yellowish gray or pale yellow. The lesions project prominently above the surrounding more or less normal mucosa and extend into the submucosa and sometimes even to the musculature. If the necrotic mass is removed, a deep bleeding ulcer remains. Usually in the earlier stages of the disease there is a marked swelling in the larynx and pharynx which results in a pronounced dyspnea.

The disease is of rather sudden onset.

Summary of Doses and Results of Sulfapyridine on Hereford Bull.

Date	Hour	Sulfapyridine administered	Temperature	Remarks
5/1	2:30 P.M.	285 grains (19 grams) of sulfapyridine sodium mixed in 300 cc. dist. water. 240 grains (16 grams) of sulfapyridine orally	103° F.	Excessive coughing with rattling, wheezing inspiratory noise, more pronounced noise on inspiration
5/2	10 A.M.	240 grains (16 grams) sulfapyridine orally.	102° F.	No change
5/2	3 P.M.	240 grains (16 grams) sulfapyridine orally.	101° F.	Temperature back to normal – appetite slightly better but still very evident inspiratory noise
5/3	10 A.M.	120 grains (8 grams) sulfapyridine orally	101° F.	Appetite greatly improved – still choking inspiratory movements and hacking cough.
5/3	3 P.M.	120 grains (8 grams) sulfapyridine orally	101° F.	Coughing greatly decreased.
5/4	10 A.M.	120 grains (8 grams) sulfapyridine orally	101° F.	Great amount of improvement, cough only occasionally and wheezing noise lessened.
5/5	2 P.M.	120 grains (8 grams) sulfapyridine orally.	101° F.	Greatly improved – slight inspiratory noise
5/6	2 P.M.		101° F.	No sulfapyridine administered due to great improvement.
5/7	2 P.M.	120 grains (8 grams) sulfapyridine orally.	101° F.	Breathing slightly labored, calf coughing up shreds of croupous material.
5/8	2 P.M.		101° F.	Observed and groomed – no medicinal agents being administered
5/9	2 P.M.	150 grains (10 grams) sulfapyridine orally	101° F.	Breathing much easier, however still slight noise on inspiration when eating
5/10	2 P.M.		101° F.	Much improved, very slight noise on inspiration
5/11	2 P.M.	150 grains (10 grams) sulfapyridine orally	101° F.	No noise noted in respirations – appetite normal, animal conducted well
5/12	2 P.M.		101° F.	Animal pronounced cured and sent home.

[1] Hutyra, Marek and Manninger, 4th English Edition, 1938, Vol. III, p. 496.

[2] Farquharson, James, Sulfapyridine in Treatment of Calf Diphtheria. *Jnl. A.V.M.A.*, 97:764, pp. 431-435.

Lassitude, reduced appetite and rise in temperature are characteristic symptoms noted. A dry, painful, easily induced cough follows shortly and may expel croupous shreds. The swelling of the pharyngeal region results in labored breathing and sometimes threatens suffocation. Unless prompt relief is given, death ensues. If the animal escapes early death from suffocation it is quite likely to die later of toxemia from broncho-pneumonia.

The prognosis of this disease, before the discovery of sulfapyridine, was guarded. The older treatments consisted in removal of the easily detached deposits from the lesions, curettment of the resultant ulcerated areas and application of tincture of iodine, hydrogen peroxide, Lugol's solution or various other agents. Supportive measures included intubation (where dyspnea threatened suffocation) iodine therapy, blood transfusion, and more recently the use of sulfanilamide. The results of these were discouraging.

Our readers write in that they like to hear about the problems and cases of other practitioners.

The use of sulfapyridine (first recommended by Farquharson) has definitely changed the picture in regard to calf diphtheria and today prognosis is usually favorable. The following case is illustrative. The patient, a nine-month-old, pure bred Hereford bull, in good condition and weighing about 500 pounds was presented for treatment April 27th with a history of a throat obstruction and difficult breathing for two days, gradually becoming more severe.

The calf showed a definite dyspnea and a choking noise was made on inspiration. It showed only a slight increase in temperature and the mucous membranes were only slightly congested. The appetite was fairly good but difficulty was noted in swallowing. When the calf attempted to eat, the inspiratory noise was much more pronounced. Stethoscopic examination of lungs revealed no evidence of pneumonia or bronchitis. Examination of the mouth with the aid of a speculum was made and an apparently painful enlargement was found posterior to the soft palate. A tentative diagnosis of an enlarged pharynx was made and iodine therapy administered. One ounce of sodium iodide in 500cc of distilled water was given intravenously April 27th and again on the 29th. No appreciable benefit from this treatment was noted. A second examination of the mouth disclosed a reddened and swollen larynx and the necrotic laryngitis was then diagnosed. Sulfapyridine therapy was started immediately and carried out as shown in the chart.

The sulfapyridine treatment was continued sparingly, due to government priority on the drug, for eleven days. Very good results were obtained and the bull was sent home completely recovered on May 14th. When the administration of sulfapyridine was commenced, the temperature was 103°F. It returned to normal within 24 hours.

Conclusions

Sulfapyridine acted almost as a specific for this case of calf diphtheria. Although the number of reported cases of necrotic laryngitis cured by the use of this drug are relatively few, the exceptional results obtained from its use in this instance certainly justify advising a wider use of it.

R. B. LANK

Shreveport, La.

Encephalomeningitis, a Sequel of Enucleation of the Eye

April 23, 1942 a five-year-old Hereford cow was brought to the veterinary clinic of the Kansas State College with an eye infection.

A diagnosis of carcinoma with secondary infection was made. Due to the extensive involvement of the ocular tissue and adhesions to the lower eyelid, enucleation of the eyeball was decided upon. The usual operation was performed using as aseptic methods as possible. Clinical observation of the animal after the operation revealed no unusual changes. The next night she died.

The postmortem changes were confined primarily to the head. The brain and the remainder of the optic nerve were removed and examined. There was considerable hyperemia around the optic nerve. The lateral ventricles were distended and filled

with pus. The meninges of the brain showed petechia indicating a severe encephalomeningitis.

At no time did this cow show clinical symptoms of an encephalitis and yet post-mortem changes indicated that death was probably due to an infection entering the brain by way of the optic nerve.

In this case where the carcinoma was extensive and all of the tissue (fat and muscle) had to be removed from the orbit, the optic nerve was transacted close to the optic foramen. In less extensive cases the operator is often enabled to transect the nerve and muscles close to the eyeball leaving most of the ocular tissue in place.

Favorable results are often obtained from enucleation of the eyeball, but death is not at all uncommon. The cause of these deaths is not always apparent, but many of them, as in this case, are probably due to the infection entering the brain by way of the optic nerve. A guarded prognosis should be given in such cases.

CARL VOELKER.

Pittsfield, Ill.

Bilateral Paralysis of the Lingual Nerve in a Horse

Accompanying my father, Dr. C. L. Nelson, Oklahoma City, Oklahoma, on a call I observed the following case.

History:—A farmer living just outside the city limits, noticed that the tongue of one of his horses was protruding and the animal was unable to eat. The horse had appeared normal the night before and the owner could find no cause for the condition.

The tongue appeared normal but extended about three inches over the lower incisors. Considerable partially masticated food was in the oral cavity.

The horse was given 500cc of 25% dextrose solution intravenously and 5cc of fluid extract of nux vomica orally.

The patient was able partially to retract the tongue and eat some food within a few minutes. Nux vomica was left with the owner to be given three times a day.

The horse improved slightly for a time but after two weeks there was a relapse. A few days later the farmer had the horse

destroyed as it was becoming emaciated.

Hutyra, Marek and Manninger[1] describe this condition as probably due to bilateral paralysis of the lingual nerve. It may be caused by trauma, deep wounds or crushing —sometimes due to a tight halter across the front of the neck, over-stretching due to forcible traction on the tongue, pressure due to effusion of blood or an abscess or tumor in the vicinity.

CONRAD L. NELSON, JR.

That was a most interesting description of the modified plan for swine sanitation in your journal.[2] The statement "Moving great numbers of animals of all species between farms and from public stockyards and from public sales back to the farm, facilitates tremendously the spread of disease," is strictly in accord with my experience. I have several times been able to trace outbreaks of disease to animals that had passed through public markets. Especially is this true of hog cholera and equine influenza. When my clients consult me about buying stock, I always advise them to get them from their neighbors if possible. I believe that if veterinarians would give this advice to their clients it would aid in prevention of the spread of disease.

REMBRANDT MORGAN

Winfield, W. Va.

[1] Hutyra, Marek and Manninger, 4th English Edition, 1938, Vol. III, p. 411.

[2] *Vet Med.*, March, 1942, pp. 111-113.

Pyometritis in a Dachshund

Approximately three years previous to this writing, Hilda was first brought into our clinic. Hilda was a Dachshund, a little over four years of age and weighing about 20 pounds. She was about a year old on her first visit to the hospital. At that time she had a litter of healthy pups delivered by Caesarian section. A year later Hilda had another litter of normal, healthy pups via the natural channels.

When Hilda was three, she was bred again and she carried the pups for 59 days. They were born dead and somewhat decomposed. Hilda was kept under hospitalization for one week and then sent home, clinically returned to normal.

Following her last unfortunate incident, every couple of months she showed signs of a subchronic infection. During one of these visits a blood count was determined. It showed a total W. B. C. count of 11,000 with the cells showing some slight degeneration and a R. B. C. count of 7,600,000. The hemoglobin index was 13. The differential blood count revealed 7% eosinophiles, 15% stabs, 61% segmentors, 4% large lymphocytes, 4% small lymphocytes, 4% atypical lymphocytes, and 5% monocytes. In view of the history and existing condition a diagnosis of metritis was made.

The Doctor in charge advised a laparohystero-oophorectomy but the owner wouldn't consent as she wanted to get another litter of puppies from Hilda.

Hilda was bred again in December, 1941, and one week following was again presented at the clinic. She had a temperature of 103° F., some slight dehydration, nausea, vomiting, slight enlargement of the abdomen, but no discharges from the vagina or cervix. Spaying was again advised and again refused. An antiseptic vaginal douche was attempted and the dog was put on sulfanilamide and sent home.

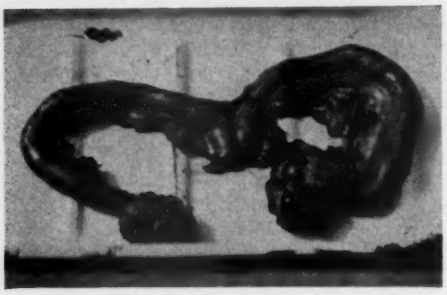
Within three weeks she was again presented to the clinic. The temperature was normal and the dog appeared normal except that the abdomen was much more distended than in a bitch of three weeks pregnancy. The owner was again advised to have Hilda operated upon.

On the morning of December 22, Hilda was again returned to the clinic. She showed a temperature of 105°F., extreme dehydration, congested mucus membranes, intoxication, a pus-like discharge from vulva, nausea, vomiting, and abdomen enormously enlarged. The owner finally consented to have her operated upon.

The patient was confined in dorsal recumbency, the operative area shaved and

Laparohystero-oophorectomy—*Horning*

cleansed with skin antiseptic, and the dog was given nembutal anesthesia. Upon making the initial median line laparotomy incision, a purulent fluid actually squirted out



Uterine horns were filled solid with pus

of the abdominal cavity. The uterus was filled solid with pus till it measured about three inches in diameter at four or five points. The ovaries, fallopian tubes, and uterus were removed and the stump of the uterus was inverted and cauterized with phenol. The abdominal cavity was irrigated with sterile saline to wash out the purulent material. The skin incision was sutured and an abdominal pack applied.

Upon examining the uterus no ruptures of any sort were found in its walls. No logical reason for the presence of the fluid in the abdominal cavity was evident until it was noticed that the fallopian tubes were also greatly distended. This led to the belief that the uterus was so filled with pus that it worked its way up the tubes and out of the fundus filling the entire abdominal cavity. It was also noticed that the horns of the uterus contained five saccule like formations, thereby making it impossible to draw out the fluid by tapping the uterus.

The patient was given sulfanilamide and placed in a clean kennel with warm coverings, but it was quite evident that she was failing and would soon die. Her temperature that afternoon was 92°F. Immediately a donor was obtained and the patient given 100cc of blood intravenously and 100cc of dextrose and saline solution subcutaneously. She was kept on sulfanilamide and placed back in her cage surrounded with bottles of warm water and covered with blankets. Within 42 hours following the operation Hilda died.

After discussing this case with our clinicians and several small animal practitioners, I arrived at two conclusions; in cases of this type it is impossible to apply a uterine douche or to tap the uterus due to the saccule-like formations in the horns, and secondly, as soon as a pyometritis is evident, hysterectomy should be performed without delay.

BERNARD M. WEINER

Irvington, N. J.

Bilateral Coxofemoral Luxation in a Bull

Observer Treasure Lad 337571, a 12-year-old Jersey bull, suffered dislocation of the right hip while in his stall at the Lakehill Jersey Farm near Joplin, Missouri, during April 1941. This unfortunate accident rendered a four-star bull, with many high production daughters, useless for normal breeding.

Treasure Lad was purchased by the department of dairy husbandry of Kansas State College and was added to that herd on September 18, 1941. At that time the outstanding symptoms manifested were a very noticeable shortening of the affected leg and unusual prominence of the trochanter major. Although this condition was a definite impediment to the bull's locomotion he retained his normal appetite, vigor, and interests in life. Several cows were bred to him using the artificial vagina for collection of the semen.

To add insult to injury on January 14, 1942, luxation of the left coxofemoral articulation occurred. For several weeks following this injury he was unable to attain a standing position but dragged himself around by means of the forelegs. As shown in the photograph taken a few weeks ago recovery has now occurred to the point where walking is possible at a difficult gait and he gets around extremely well considering the extensive damage to both hip joints. The protuberance of the trochanter major in the gluteal regions is now approximately six inches above normal on the right

side and four inches on the left side. The formation of false joints seems the most plausible explanation for the improvement in locomotion.

Bilateral coxofemoral luxation

Since the date of the second injury semen samples have been collected by massage and to date his breeding record at the college herd is as follows: Clinically diagnosed as pregnant, six; possibly pregnant, one; total inseminations, fifteen.

Dr. E. R. Frank[1] states, "When luxation occurs the luxation is usually upward and forward with the head of the femur resting upon the shaft of the ilium. The characteristic symptoms are limited abduction, easy adduction, pronounced shortening of the limb, and the unusual prominence of the trochanter."

According to Williams,[2] "The prognosis is hopeless. It is difficult or impossible to reduce the dislocation because the annular cartilage on the brim of the acetabulum dislocates and pushes into the cavity in front of the head of the femur. Even if the replacement could be accomplished, there is no way to retain the femur in position. The animal need not die. A false joint may form and the animal survive indefinitely, as a worthless cripple."

Although additional time is required to ascertain the exact end results of the case, this report suggests a method of prolonging the breeding life of limited service bulls of proved quality.

RALPH A. BRUCE

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[1] Frank, E. R., Veterinary Surgery Notes, p. 225.
[2] Williams, W. L., Veterinary Obstetrics, p. 415.

Rupture of the Tendon of Achilles in a Greyhound

April 4, 1942, a male, 60 pound, six-year-old bloodhound was presented at the veterinary clinic of the Kansas State College for treatment of a leg injury.

The animal was hunting in corn stubble in a muddy field early in the fall of 1941 and while running suddenly stumbled and began limping. The owner thought it just a sprain and no treatment was given.

Upon examining the animal it was found that the Achilles tendon was ruptured at the proximal end. The entire aponeurosis was pulled away from the muscles, which were soft and flabby. At the distal end of the ligament there was a thickening of scar tissue possibly indicating the tendon had been ruptured there also, and had healed. The animal showed no pain on palpation of the area but could bear no weight upon the leg. When weight was placed on the leg, the tuber calcis dropped to the ground. On X-Ray examination numerous shot gun pellets were revealed in the area.

Due to the long duration of the condition no treatment was advised.

In the dog rupture of the aggregated tendons attached to the tuber calcis is thought to be rare. The writer was unable to find this condition described in the literature.

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Abstracts

Equine Colic

In connection with a discussion of the etiology, prophylaxis and treatment of equine colic, it is suggested[15] that general acceptance of the cause of the condition as a disordered reaction of ferment-secreting cells to adverse environmental influences will lead to the adoption of more rational treatment than hitherto. The empiric use of drenches of turpentine and linseed oil is condemned, and the abandonment of arecoline and eserine on practical and humanitarian grounds is advocated. In the opinion of the author, about 85% of all cases of colic recover spontaneously. Treatment by passage of the stomach tube, administration of saline solutions, injection of narcotics, and judicious use of the trocar and cannula shorten the course of the disease but do not materially affect the mortality figure.

Negri Bodies in Only Ninety Per Cent of Rabies Cases

According to Johnson,[34] Negri bodies cannot always be found in man and animals dying of rabies. It is necessary to resort to animal inoculation when the microscopic examination of a brain specimen is negative. All brain specimens received at the Georgia State Health Department in 1937 for the diagnosis of rabies were examined microscopically, and those found negative were studied by mouse inoculation. Of the 771 specimens found positive for rabies, 10.5% were Negri negative. In an epizootic of fox rabies, 137 brain specimens were positive for rabies by mouse inoculation and 9.4% of these were microscopically negative. An analysis of 92 mouse positive brain specimens obtained in Alabama from dogs that had been vaccinated one month to one year before the onset of rabies demonstrated that 14% were Negri negative. When dogs were experimentally infected with rabies by intramuscular inoculation, 39.7% of the animals were negative by microscopic examination. Forty-six per cent of the dogs developing rabies were vicious at some time during the course of the disease. Only 21.4% of these were Negri negative as compared with 52% for the dogs with paralytic rabies. This partially explains the discrepancy between the Negri findings in natural and experimental rabies, as the majority of routine specimens are from vicious and biting dogs. The duration of symptoms before death is correlated to the absence or abundance of Negri bodies. Vaccinated dogs dying of rabies exhibited the same clinical course as unvaccinated controls, and the error in microscopic diagnosis was approximately the same in the two groups. The studies suggest that rabies street virus is altered in either virulence or manner and site of multiplication during epizootics of the disease, and at this time a higher proportion of the infected animals will be Negri negative. The rapid microscopic diagnostic method of Sellers is recommended. The indications for animal inoculation of brain specimens are enumerated, and the white mouse is recommended for the purpose.

Experiences at a German Army Veterinary Hospital

1. *General Anesthesia.*—The former German reliance on chloral hydrate has given place under the Nazi regime to chloroform inhalation anesthesia, which is applied in the English manner before casting or any kind of restraint. Over 1,000 horses have been so treated without complication.[35]

2. *Wound Treatment.*—Emphasis is laid on the importance of the natural powers of healing and on the harmfulness of the frequent application of more or less strong disinfectants and antiseptics. Rest and bandaging are important. Fistulous withers is best treated non-surgically. Drainage openings, if made, should be led through uninflamed tissue and should be made by actual cautery or surgical diathermy. For-

[15] Rainey, W., 1939. Equine colic. *Jnl. So. Afr. V. M. A.* 10, pp. 13-22. Abst in *Vet. Rec.*

[34] Johnson, H. N., 1942. Significance of the Negri body in diagnosis and epidemiology of rabies. *Ill. Med. Jnl.* 81, p. 382. Abst. in *Jnl. A.M.A.* 119:14, p. 1138.

[35] Westhues, 1940. Experiences at an Army Veterinary Hospital (transl. title) *Tierärztl. Rdsch.* 46, pp. 526-528, Abst. *Vet. Rec.* 53:26, p. 375.

maldehyde (0.5%) is recommended for wounds and sores of the feet, as it dries the parts well. It is also used for soaking into a bandage which is placed over open joint wounds which are not irrigated. Abscesses are emptied and repeatedly irrigated with revanol (0.02%), which is sucked out, not left in for a period. Plastic operations to make good skin loss are used in suitable cases.

3. *Canker of the foot* is largely a general metabolic disorder. It is treated locally by a pressure bandage and the horse kept at work if possible. Operations are not undertaken before the foregoing treatment has been used for a period of four to six weeks without success.

4. *Laminitis.*—Cases with dropped coffin bone require at least four months' treatment, which is effected by a bar shoe open at the toe so as not to bear on the toe of the hoof.

Carotene and Riboflavin in Alfalfa

By making use of the Peterson-Hughes-Freeman method in carotene determination and the Hodson and Norris method, with modifications, to determine the riboflavin content in alfalfa meals the authors[36] found that the analyses of 99 samples of alfalfa collected in Kansas in 1940 show that:

The dehydrated meals contain considerably more carotene and riboflavin than the sun-cured meals; the leaf meals contain considerably more carotene and riboflavin than the meals; there is a large variation in the carotene content of the meals and leaf meals, whether dehydrated or sun-cured; the wide variation in the carotene content of alfalfa meals in the same classification shows that the designation used at the present time gives little indication of the value of alfalfa meal as a carrier of carotene; the feeds in the hands of the manufacturer were, on the average, 258 percent greater in carotene content than those in the hands of the mixer; the variation in riboflavin content is not nearly as marked as that for carotene and that there is a correlation between the carotene and riboflavin content of the various meals. This relationship varies from a nonsignificant correlation of the sun-cured meals to a very highly significant correlation in the case of the dehydrated meals in the hands of the manufacturers.

Further work is being undertaken to observe loss of carotene during storage of alfalfa meals and also mixed feeds containing alfalfa.

[36] Hanke, A. R. and A. T. Perkins, 1942. Carotene and riboflavin in alfalfa. *Poultry Sci.*, 21:3, pp 195-199.

Fish Meal for Pigs

Robinson,[38] reporting various feeding tests at the Ohio and other experiment stations, concludes that fish meal is superior to tankage as a protein supplement for growing and fattening pigs by a margin of 16.7%, and less expensive than tankage, alfalfa and mineral mixture by 19%.

Effects of Vitamin B_1 (Thiamine) Deficiency

Williams and his collaborators[33] found in a previous study that severe restriction of thiamine was associated with inactivity, apathy, serious derangement of metabolic processes, loss of weight and prostration. In the present study moderate, prolonged restriction of this vitamin, but not of food calories, was associated with states of emotional instability reflected by irritability and moodiness, quarrelsomeness, lack of cooperation, vague fears progressing to agitation, mental depression, variable restriction of activity and numerous somatic symptoms. Detectable metabolic disturbances occurring irregularly were of variable degrees of severity and were reflected in disturbance of function of various tissues of the body. In all cases of induced deficiency of thiamine, mental and physical inefficiency preceded, by weeks or months, other more objective manifestations.

[38] Robinson, W. L., 1942. Fish meal for growing and fattening pigs. *Bimonthly Bul.*, Ohio Agr. Exp. Sta., 27:217, pp. 117-123.

[33] Williams, R. D., H. L. Mason, B. F. Smith and R. M. Wilder, 1942. Induced thiamine (vitamin B_1) deficiency and thyamine requirement of man. *Arch. Int. Med.* 69, pp. 721-930. Abst. in *Jnl. A.M.A.* 119:14, p. 1136.

STAMPS AND BONDS
★ ★ ★ BUY WAR SAVINGS

Book Reviews

Medical Diseases in Tropical and Subtropical Areas. *By Lieut. Gen. W. P. MacArthur,* Director General Army Medical Services, The War Office, Great Britain. First American edition. Cloth bound; 282 pages, 38 illustrations. Chemical Publishing Co., Inc., Brooklyn, N. Y. 1942. Price—$4.75.

It is not often that a doctor gets so much for so little. In the first American edition of this manual on medical diseases the veterinarian and practitioner in the military service gets an intelligent evaluation from the candid discussions on the remarkable advances in tropical medicine of the past two decades. The best of the leading articles have been abstracted and the essential material of a growing science has been brought up-to-date. The scope of this book presents the modern conception of tropical and subtropical disease from the standpoint of etiology, symptomatology, differential diagnosis and treatment. Facts take the place of theories and speculations.

After an introductory chapter on ancylostomiasis, this text is planned mainly into two parts. The first being given over to preventive tropical medicine. The second to a timely discussion on Protozoa. The section on preventive tropical medicine discusses material recently recognized as important on arthropod pests. Special emphasis is given to the disease vectors,—lice, fleas, ticks, stable flies, tsetse flies, mosquitoes, etc., as well as the true parasitic forms with illustrations of each.

In the section dealing with Protozoa the British edition has been rewritten and new illustrations added. The chapter on malaria reports fully recent successes with the new synthetic antimalarial remedies. Included in this section are chapters on filariasis, Rickettsia, leishmaniasis, Spirochaeta, schistosomiasis, and arthropod-borne viruses. Worthy of special mention are chapters on tropical typhoid fever, typhus fever, undulant fever, beriberi, and a new chapter dealing with cysticercosis. The value of the sulfonamide drugs in the treatment of cerebrospinal fever is discussed in an entertaining manner. Rules of nomenclature for the arthropod group are outlined in the appendix.

The book is a new interpretation of vital facts containing a liberal education in utilitarian tropical medicine which belongs in the library of every practitioner, army veterinary officer or student of veterinary medicine.—J. A. U.

* * * *

The Vitamin Content of Meat. *By Harry A. Waisman,* Ph.D., Research Associate in Biochemistry, University of Wisconsin, Madison, and *C. A. Elvehjem,* Ph.D., Professor of Biochemistry, University of Wisconsin. 210 pages. Burgess Publishing Co., Minneapolis, Minn., 1941. Price—$3.00.

The intensive research on the nutritive value of meat carried on at the University of Wisconsin during the past few years has logically culminated in the publication of this book, which combines the results of these original investigations with a review of the literature. Dietitians will be interested in the tables giving the nutritive values of several cuts of meat and in the vitamin losses observed as the result of the cooking methods used in preparing these cuts for the table.—*Jnl. A.M.A.*

* * * *

William Henry Welch and the Heroic Age of Medicine. *By Simon Flexner* and *James Thomas Flexner.* Cloth bound; 539 pages, 26 illustrations. Viking Press, New York, N. Y. Price—$3.75.

The story of a great leader in medicine who figured large in nearly every advance in medical science during that astonishingly progressive half century from 1880 to 1930 must of necessity include much of interest and importance to veterinary medicine since its development was a part of the development of general medical science. The early instructors and later the pupils and associates of Welch comprise most of the names associated with the fundamental studies that constitute the basis upon which today's knowledge of pathology and bacteriology rest.

The story is well albeit somewhat tediously told and the reader must marvel that one individual could in one lifetime acquire so wide an influence or use it so effectively in such varied fields. Welch was able to divert medicine from empiric trends into

scientific channels, to turn Congress from the enactment of antivivisection legislation to appropriations for research that involved animal experimentation, to persuade wealthy philanthropists to found scientific medical laboratories and to teach medical students and was surprisingly successful in all these many other activities including much of the development of public health measures in the United States.

This biography of the "dean of American medicine" is well worth reading for both entertainment or instruction. It is a fairly complete record of the development of scientific medicine on this continent, of the beginnings of Johns Hopkins Hospital, and of the Johns Hopkins Medical School of which Welch was the first dean, of the Rockefeller Foundation, of the revolution in medical education, of the development of our public health system and of medical research with many side glances at most of the leaders in medicine of the present day and of the past fifty years.

* * * *

From Cretin to Genius. *By Serge Voronoff, M. D.*, author of "The Practical Application of Grafting Upon Live Stock"; "Conquest of Life;" "Love and Thought in Animals and Man"; and many other works. Cloth bound; 281 pages. Alliance Book Corp., 212 5th Ave., New York, 1941. Price—$2.75.

In 1916 Doctor Voronoff became head surgeon of (French) Auxiliary Hospital 197, which was established to perform bone grafting operations on wounded soldiers. In 1921 he became director of Experimental Surgery at the College of France. While there he conducted his experiment in gland grafting for improving the quality and quantity of the fleece of sheep. The announcement engendered much discussion and much controversy in the veterinary press but was all but forgotten in the furore aroused by his announcement of gland grafting as a method of rejuvenation for man.

The present work contains a great deal about geniuses, but little of cretins. It is interesting and entertaining, but presented in a sensational manner. The author's inquiring mind ranges through all fields of human interest and provides an amazing collection of anecdotes concerning the geniuses of all time. When he launches into his theories of thinking, and particularly of the inheritance of geniuses, he swims in an ocean of speculation. His discussion if not instructive must be entertaining.

You may obtain any book reviewed in this department by remitting the published price to the Book Department of VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago, Ill.

The Merck Manual of Therapeutics and Materia Medica. A source of ready reference for the physician. Seventh edition. Flexible cloth bound; 1462 pages. Merck & Company, Rahway, N. J., 1940. Price—$2.00.

Beginning in 1899 as a 250 page book probably intended to extend the acquaintance of American physicians with the products of Merck & Company this manual during more than 40 years and through seven editions has apparently come to represent a major ambition of Merck and an attempt to include between its covers at least mention of everything of present day importance to the physician in the diagnosis and treatment of disease. The result is a volume of 256 chapters and nearly 1500 pages of condensed information. And the price it may be noted is little more than one-tenth the usual price of medical works of comparable scope and size.

Although intended for the physician the manual of course contains much of value for the veterinarian because of the overlapping of veterinary and medical materia medica, because of the identity of certain diseases in man and animals and the similarity of diagnostic procedures.

Previous editions of the Merck manual have found wide use among veterinarians and this edition will also prove useful to them since it contains a number of improvements including a cross reference and therapy section in which are the many important additions to the practitioners armamentarium that have been introduced during the past few years.

The Dachshund. *By Grayce Greenburg.* Third edition. Cloth bound; 160 pages, profusely illustrated. Judy Publishing Company, Chicago, Ill., 1942. Price—$2.50.

Another Judy book has come off the press—this time it is the third edition of that popular book about "the dog that is sold by the yard"—the Dachshund. This volume is a treat for those who are interested in the breed. It contains 54 chapters and takes up fully the history of the dog, including bloodlines, disease, feeding, training, and the care of the dam and her puppies. It also gives instructions on what kennel records should be kept by the owner. The book should prove of great interest and practical help to the breeder and exhibitor, as it includes a Parker pedigree insert. It should interest also the numerous owners of the breed.

* * * *

Veterinary Anaesthesia. *By John G. Wright,* F.R.S.C., Professor of Veterinary Surgery, University of Liverpool, formerly Professor of Surgery, Royal Veterinary College, London. Cloth bound; 207 pages, 52 illustrations. Alexander Eger, Chicago, 1942. Price—$3.50.

The author's extensive experience has enabled him to present a welcome text on this well-worn subject. The whole field of anesthesia in all of the domestic animals is discussed, special consideration being given to the newer, non-volatile, general anesthetics and hypnotics. There is much in the text to commend; little to criticize. Of the latter the discussion of inhalation anesthesia of the dog and cat is the most conspicuous example. This discussion is strictly pre-war (World War 1) and the appliances illustrated and described were long since outmoded in this country. Perhaps this is the chief reason the non-volatile anesthetics are favored and receive most of the discussion.

Much stress is put upon the manner in which anesthetics are administered. The author rightly pointing out that the safety or hazard of anesthesia is in no small degree dependent upon this factor. In regional and local anesthesia detailed consideration is given to the area anesthetized by injections at various sites and usually clear directions are given for making the injections for nerve blocking. The work constitutes a useful reference for the practitioner when confronted with unusual problems in anesthesia in animals, or when called upon to perform operations with which he is not entirely familiar.

* * * *

Hoare's Veterinary Materia Medica and Therapeutics. *By E. Wallis Hoare,* F.R.C.V.S. Sixth edition, edited and revised *by J. Russel Greig,* Ph.D., M.R.C.V.S., F.R.S.E., Director of Moredun Research Institute, formerly Professor of Medicine and Materia Medica, Royal (Dick) Veterinary College, Edinburgh. Cloth bound; 528 pages. Alexander Eger, Chicago, 1942. Price—$6.50.

It is unnecessary to say anything of the usefulness of a veterinary text that is still in use 47 years after original publication and that has undergone six revisions. Veterinary works do not reach six editions nor half that number without possessing merit of a high order. Naturally the present edition, which is the third edition that Doctor Greig has edited, differs greatly from the first publication in 1895, but it retains, and the work has retained, through all its editions, what may be termed eminent practicability—which is to say the text is concise, permitting reasonable comprehensiveness in its field, the statements direct and systematically arranged for ready reference. That it is based upon the British instead of the U. S. Pharmacopeia is a slight disadvantage to American veterinarians.

New additions to the current edition include the barbiturates and the sulfa compounds. The omission of sulfaguanidine from the latter is somewhat puzzling as is also the omission of mention of the chick vaccine for the prevention of encephalomyelitis and strain 19 vaccine for the prevention of brucellosis.

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Cats and Their Care. An eight-page leaflet. Free. The Anti-Cruelty Society, 157 W. Grand Ave., Chicago, Ill.

Purina Goat Book. This 31-page booklet discusses breeds, milking and dry goats and feed—also enumerates goat products. Free. Purina Mills, St. Louis, Mo.

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